

Crustacea Decapoda : Studies of the *Plesionika narval* (Fabricius, 1787) group (Pandalidae) with descriptions of six new species

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ABSTRACT

Samples collected by ORSTOM (Institut de Recherche Scientifique pour le Développement en Coopération), Service Mixte de Contrôle Biologique des Armées (SMCB) and the National Taiwan Ocean University in the Indo-West Pacific (off Madagascar, Seychelles Islands, Taiwan, Philippines, Indonesia, Chesterfield Islands, New Caledonia and Polynesia) as well as others obtained on loan from various museums led to a reexamination of the species belonging to the *Plesionika narval* group.

Fourteen species are recognized of which 6 are new : *P. yui* from Taiwan, *P. echinicola* from New Caledonia, *P. laurentae* from New Caledonia and Eastern Australia, *P. flavicauda* from New Caledonia and Polynesia, *P. rubrior* and *P. curvata* from Polynesia.

P. escatilis (Stimpson, 1860) is considered to be a synonym of *P. narval*. The specimens from the Atlantic identified as STIMPSON'S species by LEMAITRE and GORE (1988) are identified as *P. longicauda* (Rathbun, 1901).

P. narval and *P. serratifrons* (Borradaile, 1900) are considered as distinct species but so similar that finding reliable characters to separate them is very difficult especially as individual variations are observed. *P. narval* is presently regarded as living only in the Mediterranean and Eastern Atlantic (from Spain to Cape Verde Islands) but it appears

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that it may also be widespread in the Indo-West Pacific. On the other hand *P. serratifrons* probably occurs only in the South-West Pacific and with a rather restricted distribution.

A key mainly for adults is offered for the identification of the species of this group.

As coloration very often seems to be a reliable character for identifying fresh specimens, color photographs are included. Unfortunately it was not possible to obtain information on the coloration of all the species and consequently this character could only be used rarely in the key.

RÉSUMÉ

Crustacea Decapoda : Étude des *Plesionika* du groupe *narval* (Fabricius, 1787) (Pandalidae).
Description de six espèces nouvelles.

A partir de récoltes faites par l'ORSTOM (Institut de Recherche Scientifique pour le Développement en Coopération), le Service Mixte de Contrôle Biologique des Armées (SMCB) et la National Taiwan Ocean University dans l'Indo-Ouest Pacifique (à Madagascar, aux Seychelles, à Taïwan, aux Philippines, en Indonésie, aux îles Chesterfield, en Nouvelle-Calédonie et en Polynésie) et des prêts de divers Muséums, une révision des *Plesionika* du groupe *narval* est tentée.

Quatorze espèces sont reconnues dont cinq sont nouvelles : *P. yui* de Taïwan, *P. echinicola* de Nouvelle-Calédonie, *P. laurentae* de Nouvelle-Calédonie et de la côte est d'Australie, *P. flavicauda* de Nouvelle-Calédonie et de Polynésie, *P. rubrior* et *P. curvata* de Polynésie.

Par ailleurs, il est montré que *P. escatilis* (Stimpson, 1860) est synonyme de *P. narval* (Fabricius, 1787) et que les spécimens de l'Atlantique identifiés à l'espèce de STIMPSON par LEMAITRE et GORE (1988) doivent être considérés comme appartenant à *P. longicauda* (Rathbun, 1901).

P. narval et *P. serratifrons* (Borradaile, 1900) sont considérées comme étant distinctes mais si proches que les caractères les séparant avec certitude se révèlent bien difficiles à établir, compte tenu des variations individuelles observées. *P. narval* ne serait pas confinée à la Méditerranée et à l'Atlantique oriental, de l'Espagne aux îles du Cap Vert, mais se trouverait également dans la plus grande partie de l'Indo-Ouest Pacifique. *P. serratifrons*, au contraire, ne se trouverait que dans le Sud-Ouest Pacifique où sa répartition serait plus réduite.

Une clé d'identification, malheureusement valable surtout pour les adultes, est proposée pour les 13 espèces reconnues.

La coloration semblant devoir être, dans beaucoup de cas, un excellent caractère d'identification lorsque le matériel est frais, plusieurs photos en couleur sont publiées. Malheureusement il ne nous a pas été possible d'obtenir les colorations de toutes les espèces ni leurs variations et, par suite, d'introduire ce caractère dans la clé, comme nous l'aurions souhaité.

INTRODUCTION

The *Plesionika narval* (Fabricius, 1787) group is characterized by the rostrum being very long and armed with numerous closely set teeth along almost the entire length of both borders. The species belonging to this group were placed previously in the genus *Parapandalus* Borradaile, 1900, because they lacked epipods on the pereopods but this genus has been synonymised recently with the genus *Plesionika* Bate, 1888, by CHACE (1985). Members of this group are numbered among the common carideans in deep-water samples and they are known generally as *P. narval* (Fabricius, 1787) in the Mediterranean and Atlantic, and *P. serratifrons* (Borradaile, 1900) and *P. spinipes* Bate, 1888, in the Indo-West Pacific (e.g. HOLTHUIS, 1980; MIYAKE, 1982). The other two species, *P. pacifica* Edmondson, 1952, from Hawaii and *P. multispinosa* (Zarenkov, 1971) from Easter Island are little known and often overlooked. All these species closely resemble each other but their original descriptions are very superficial and the types poorly known.

A brief account of the *P. narval* group was given in a recent publication by CHACE (1985) on material from the Philippines. The name *P. grandis* Doflein, 1902, was revived and a new species, *P. quasigrandis*, was described. Nevertheless, there are still indications that there are more species in this group (e.g. KING, 1984; CHACE, 1985).

The present study compares the types or topotypic specimens of most of the known species with a large collection of *P. narval* group material from many different localities. It has been found that *P. narval* is probably distributed widely in the Indo-West Pacific while *P. serratifrons* and *P. spinipes* are found only in the South-West Pacific. The eastern Atlantic material, from Senegal and southward, is distinct from *P. narval* and identified with the western Atlantic population as *P. longicauda* (Rathbun, 1901). *P. multispinosa*, until now known only from

4 females off Easter Island, seems restricted to this area. *P. pacifica* seems to be a good species but the type is in poor condition and more topotypic material would be useful in defining the characteristics of the species. Six new species: *P. yui* from Taiwan, *P. echinicola* from New Caledonia, *P. laurentae* from New Caledonia and Eastern Australia, *P. flavicauda* from New Caledonia and Polynesia, *P. rubrior* and *P. curvata* from Polynesia, are described. This increases the number of species in the *P. narval* group to at least 14.

The group can be divided into the *P. narval* and *P. spinipes* subgroups, differing in that the abdominal pleuron IV is pointed in the latter. Although the size of the dactylus of the posterior pereopods and the number of rostral teeth are sometimes very useful characters to separate the species, they are often difficult to observe, the pereopods being easily lost and the rostrum broken. Moreover, the number of rostral teeth in these species is very high and to count all of them accurately is time-consuming. The relative spacing of the rostral teeth on the dorsal and ventral borders of the posterior part of the rostrum was found to be a practical diagnostic character since only the posterior section of the rostrum is required. The species of the *P. spinipes* subgroup are usually quite easy to separate. In the *P. narval* subgroup, the meristic characters of the species are often extremely variable and sometimes positive identification can only be made by using several characters. Coloration appears to be a very useful character in distinguishing the species in this group, but it has not been described in all of them.

Since the general characteristics of the species are very similar, only diagnostic characters are described in detail. Detailed descriptions of the general characteristics of these species are available in DE MAN (1920) and CHACE (1985).

In the following account, carapace length refers to the postorbital carapace length; when measurements are given in the lists of material examined they refer to this length.

In the lists of material examined the capital letters preceding the station number refer to the gear used: DC: Charcot dredge, DW: Waren dredge, CP: Beam trawl, CC: Otter trawl (shrimps), CH: Otter trawl (fishes).

The specimens are deposited principally in the collections of the Muséum national d'Histoire naturelle in Paris; otherwise the Institutions where the specimens are held are indicated by the following abbreviations: BM: Bishop Museum, Honolulu; BMNH: The Natural History Museum, London; NTOU: National Taiwan Ocean University, Keelung; RMNH: Nationaal Natuurhistorisch Museum, Leiden; UMZC: University Museum of Zoology, Cambridge; USNM: National Museum of Natural History, Washington.

In the Muséum national d'Histoire naturelle, only types and illustrated specimens are registered. Some paratypes of all the new species have been deposited in the National Museum of Natural History, Washington.

SYSTEMATIC ACCOUNT

Key to the species of *Plesionika narval* group

1. Abdominal pleuron IV with denticle at posteroventral angle 2 ("*spinipes*" subgroup)
— Abdominal pleuron IV without denticle at posteroventral angle 5 ("*narval*" subgroup)
2. Carpus of pereopod I shorter than 4/5 carapace length, rostrum usually with more than 42 ventral teeth..... *P. echinicola*
— Carpus of pereopod I longer than 4/5 carapace length, rostrum usually with fewer than 42 ventral teeth..... 3
3. Posterior 10 ventral rostral teeth corresponding to 8 or fewer dorsal teeth, penultimate segment of maxilliped III usually less than 1.5 times as long as terminal segment
..... *P. quasigrandis*
— Posterior 10 ventral rostral teeth corresponding to more than 8 dorsal teeth, penultimate segment of maxilliped III more than 1.5 times as long as terminal segment 4
4. Dactylus of pereopod III less than 1/7 times as long as propodus, posterior 10 ventral rostral teeth usually corresponding to more than 13 dorsal teeth *P. spinipes*

- Dactylus of pereopod III more than 1/7 times as long as propodus, posterior 10 ventral rostral teeth usually corresponding to 13 or fewer dorsal teeth..... *P. grandis*
5. Epipod absent or rudimentary at maxilliped III..... 6
- Epipod well-developed at maxilliped III..... 7
6. Maxilliped III without epipod, rostral teeth somewhat well-spaced and with posterior 10 ventral teeth corresponding to more than 7 dorsal teeth, dactylus of pereopod III conical and about 1/10 as long as propodus..... *P. longicauda*
- Maxilliped III with rudimentary epipod, rostral teeth abutting against each other and with posterior 10 ventral rostral teeth corresponding to less than 8 dorsal teeth, dactylus of pereopod III paddle-shaped more than 1/5 as long as propodus..... *P. yui*
7. Rostrum "S"-shaped and with low but distinct basal crest, posterior 10 ventral teeth corresponding to more than 15 dorsal teeth..... *P. laurentae*
- Rostrum with basal region more or less straight and without distinct basal crest, posterior 10 ventral teeth usually corresponding to 15 or fewer dorsal teeth..... 8
8. Telson 9/10 or less as long as abdominal somite VI..... 9
- Telson as long as or slightly longer than abdominal somite VI in adults..... 11
9. Rostrum with more than 70 dorsal and 50 ventral teeth, penultimate segment of maxilliped III usually more than 1.4 times as long as terminal segment..... *P. rubrior*
- Rostrum with less than 70 dorsal and 50 ventral teeth, penultimate segment of maxilliped III 1.4 times or less as long as terminal segment..... 10
10. Posterior 10 ventral rostral teeth corresponding to about 7 dorsal rostral teeth.....
..... *P. multispinosa*
- Posterior 10 ventral rostral teeth corresponding to about 12 dorsal rostral teeth.....
..... *P. pacifica*
11. Rostrum with 58 or more ventral teeth, tail-fan and some abdominal somites yellowish ..
..... *P. flavicauda*
- Rostrum usually with fewer than 58 ventral teeth, tail-fan and some abdominal somites not yellowish..... 12
12. Rostrum strongly and abruptly curved, posterior 10 ventral teeth usually corresponding to fewer than 9 dorsal teeth, penultimate segment of maxilliped III less than 1.4 times as long as terminal segment..... *P. curvata*
- Rostrum not abruptly curved, posterior 10 ventral teeth corresponding to 9 or more dorsal teeth, penultimate segment of maxilliped III usually more than 1.4 times as long as terminal segment..... 13
13. Ventral base of rostrum without distinct notch, posterior 10 ventral rostral teeth usually corresponding to 13 or fewer dorsal teeth..... *P. narval*
- Ventral base of rostrum usually with distinct notch, posterior 10 ventral rostral teeth usually corresponding to more than 13 dorsal teeth..... *P. serratifrons*

Plesionika echinicola sp. nov.

Figs 1 a, 2 a, 3 a-b, 19, 20

MATERIAL EXAMINED. — New Caledonia. "Vauban" 1976-1978 : 300 m, 19.10.1976 : 3 specs. — S. Isle of Pines, 300 m, 20.10.1976 : 13 specs (All paratypes, MNHN-Na 12607). — 22°47.05'S, 167°10.00'E, 360 m, 13. 04. 1978 : 5 specs.

LAGOON SURVEY : stn 420, 22°44'S, 167°09'E, 345 m, 24 .01.1985 : 22 specs.

BIOCAL : stn CP 110, 22°12.38'S, 167°06.43'E, 275-320 m, 9.09.1985 : 8 specs.

MUSORSTOM 4 : stn CP 171, 18°57.8'S, 163°14.0'E, 425 m, 17.09.1985 : 16 specs (All paratypes, MNHN-Na 12605). — Stn CP 172, 19°01.2'S, 163°16.0'E, 275-330 m, 17.09.1985 : 3 specs. — Stn DW 181, 18°57.2'S, 163°22.4'S, 350 m, 18.09.1985 : 37 specs. — Stn DW 183, 19°01.8'S, 163°25.8'E, 280 m, 18.09.1985 : 16 specs. — Stn CP 193, 18°56.3'S, 163°23.2'E, 415 m, 19.09.1985 : 23 specs. — Stn DW 196, 18°55.0'S, 163°23.7'E, 450 m, 20.09.1985 : 5 specs. — Stn DW 210, 22°43.7'S, 167°09.3'E, 340-345 m, 28.09.1985 : 5 specs. — Stn CP 213, 22°51.3'S, 167°12.0'S, 405-430 m, 28.09.1985 : 23 specs. — Stn CP 214, 22°53.8'S, 167°13.9'E, 425-440 m, 28.09.1985 : 22 specs (All paratypes, MNHN-Na 12606). — Stn DW 222, 22°57.6'S, 167°33.0'E, 410-440 m, 30.09.1985 : 5 specs.

SMIB 2 : stn DW 9, 22°55.0'S, 167°14.7'E, 450 m, 6.02.1986 : 1 spec. — Stn DW 10, 22°54'S, 167°12'E, 395-410 m, 6.02.1986 : 6 specs. — Stn DW 13, 22°52.0'S, 167°13.0'E, 427-454 m, 18.09.1986 : 2 specs.

CHALCAL 2 : stn CP 18, 24°47.0'S, 168°09.4'E, 274 m, 27.10.1986 : 98 specs. — Stn CP 20, 24°44.6'S, 168°09.3'E, 230 m, 27.10.1986 : 90 specs (Holotype, MNHN-Na 12614; paratypes, MNHN-Na 12665).

SMIB 3 : stn CP 15, 23°41.0'S, 168°00.0'E, 280 m, 23.05.1987 : 17 specs. — Stn DW 18, 23°42.0'S, 167°59.0'E, 338 m, 23.05.1987 : 10 specs.

SMIB 4 : stn DW 53, 23°40.1'S, 167°59.9'E, 270 m, 9.03.1989 : 1 spec. — Stn DW 68, 22°55.0'S, 167°16.0'E, 440 m, 10.03.1989 : 3 specs.

SMIB 5 : stn DW 76, 23°41.2'S, 168°00.5'S, 280 m, 7.09.1989 : 6 specs (All paratypes, USNM). — Stn DW 77, 23°40.8'S, 168°01.1'E, 270 m, 7.09.1989 : 1 spec. — Stn DW 86, 22°19.8'S, 168°42.8'E, 320 m, 13.09.1989 : 1 spec. — Stn DW 93, 22°20.0'S, 168°42.3'E, 255 m, 13.09.1989 : 11 specs. — Stn DW 94, 22°19.6'S, 168°42.8'E, 275 m, 13.09.1989 : 1 spec. — Stn DW 97, 23°01.1'S, 168°18.0'E, 300 m, 14.09.1989 : 3 specs. — Stn DW 102, 23°19.6'S, 168°04.7'E, 305 m, 14.09.1989 : 3 specs. — Stn DW 103, 23°17.4'S, 168°04.8'E, 315 m, 14.09.1989 : 13 specs.

Chesterfield Islands, CHALCAL 1 : stn DC 8, 20°47.3'S, 161°01.4'E, 40 m, 15.07.1984 : 68 specs. — Stn CP 4, 19°33.9'S, 158°37.9'E, 370 m, 16.07.1984 : 2 specs. — Stn CP 17, 22°34.7'S, 159°15.3'E, 295 m, 28.07.1984 : 16 specs.

MUSORSTOM 5 : stn CP 267, 25°23.6'S, 159°47.2'E, 285 m, 8.10.1986 : 2 specs. — Stn CP 275, 24°46.6'S, 159°40.3'E, 285 m, 9.10.1986 : 4 specs. — Stn CP 288, 24°04.8'S, 159°36.8'E, 270 m, 10.10.1986 : 25 specs. — Stn CP 289, 24°01.5'S, 159°38.4'E, 273 m, 10.10.1986 : 4 specs. — Stn DW 299, 22°47.7'S, 159°23.7'E, 360-390 m, 11.10.1986 : 32 specs. — Stn DW 300, 22°48.27'S, 159°23.94'E, 450 m, 11.10.1986 : 3 specs. — Stn DW 303, 22°11.93'S, 159°23.17'E, 332 m, 12.10.1986 : 13 specs. — Stn CP 307, 22°11.07'S, 159°24.07'E, 345-350 m, 12.10.1986 : 14 specs. — Stn CP 309, 22°10.2'S, 159°22.8'E, 340 m, 12.10.1986 : 43 specs. — Stn CP 311, 22°13.6'S, 159°23.9'E, 320 m, 12.10.1986 : 14 specs (All paratypes, MNHN-Na 12603). — Stn CP 312, 22°17.2'S, 159°24.8'E, 315-320 m, 12.10.1986 : 64 specs. — Stn CP 316, 22°25.13'S, 159°24.00'E, 330 m, 13.10.1986 : 16 specs (All paratypes, MNHN-Na 12604). — Stn DW 338, 19°51.6'S, 158°40.4'E, 540-580 m, 15.10.1986 : 2 specs. — Stn CP 352, 19°31.4'S, 158°37.7'E, 310-337 m, 17.10.1986 : 5 specs. — Stn CP 373, 19°52.92'S, 158°38.66'E, 380-390 m, 20.10.1986 : 65 specs.

TYPES. — *Holotype* : 1 ♂, 17 mm cl. (MNHN-Na 12614), New Caledonia, CHALCAL 2, stn CP 20, 24°44.6'S, 168°09.3'E, 230 m, 27.10.1986.

Paratypes : 8 specs (MNHN-Na 12665), New Caledonia, CHALCAL 2, stn CP 20, 24°44.6'S, 168°09.3'E, 230 m, 27.10.1986. — 13 specs (MNHN-Na 12607), S. Isl. of Pines, 300 m, 20.10.1976. — 16 specs (MNHN-Na 12605), MUSORSTOM 4, stn CP 171, 18°57.8'S, 163°14.0'E, 425 m, 17.09.1985. — 22 specs (MNHN-Na 12606), *idem*, stn CP 214, 22°53.8'S, 167°13.9'E, 425-440 m, — 14 specs (MNHN-Na 12603), MUSORSTOM 5, stn CP 311, 22°13.6'S, 159°23.9'E, 320 m, 12.10.1986. — 16 specs (MNHN-Na 12604), *idem*, stn CP 316, 22°25.13'S, 159°24.00'E, 330 m, 13.10.1986. — 6 specs (USNM), SMIB 5, stn DW 76, 23°41.2'S, 168°00.5'S, 280 m, 7.09.1989.

DIAGNOSIS. — Rostrum, slightly more than twice as long as carapace, directed slightly upwards and armed with 45-57 dorsal and 38-52 ventral teeth, posterior 10 ventral teeth corresponding to 8-10.5 dorsal teeth. Post-rostral series with 4-5 teeth. Dorsal end of orbital margin slightly truncate. Scaphocerite nearly as long as carapace. Maxilliped III without epipod, penultimate segment 1.25-1.6 times longer than terminal segment, two segments combined 0.75-1.05 times as long as carapace. Carpus of pereopods I short, less than 0.8 carapace length; pereopods II subequal and with 18-22 carpal articles; pereopods III with propodus 0.45-0.85 times as long as carapace and 7-13 times longer than dactylus, accessory spine of dactylus distinct and situated posterior to terminal spine. Abdominal pleura IV and V pointed. Telson distinctly longer than abdominal somite VI.

DESCRIPTION. — Rostrum, with basal region directed downwards or nearly horizontal and often with well-marked lateral carina, slightly curved upwards (sometimes rather strongly curved in ovigerous females) after

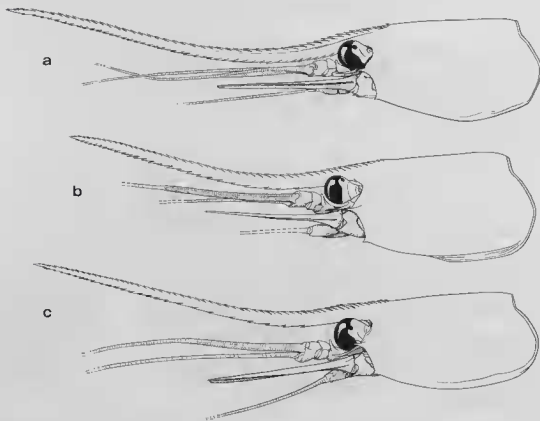


FIG. 1. — Carapace and anterior appendages: a, *Plesionika echinicola* sp. nov., ♂ holotype 16.4 mm cl. (MNHN-Na 12614), New Caledonia, CHALCAL 2, stn CP 20, 230 m. — b-c, *Plesionika spinipes* Bate, 1888: b, ♂ 15.0 mm cl. (MNHN-Na 12618), New Caledonia, MUSORSTOM 4, stn 248, 380-385 m. — c, ♀ 13.8 mm cl. (MNHN-Na 12617), French Polynesia, Maiao, 320 m.

passing antennular peduncle and sometimes bending slightly downwards again near apex, far overreaching scaphocerite and 1.75-2.5 (avg. 2.2) times longer than carapace, armed on almost entire dorsal border with 45-57 (avg. 50) closely set teeth, ventral border with 38-52 (avg. 46 and mostly more than 42) teeth, posterior 10 ventral teeth corresponding to 8-10.5 (avg. 9) dorsal teeth. 4-5 post-rostral teeth present on carapace, some posterior teeth with faint basal suture. Eye spherical with distinct ocellus. Orbital margin generally concave with dorsal end slightly truncate. Antennal and pterygostomial spines well-developed. Stylocerite sharply acute and with outer margin not curved upward, extending to distal margin of basal segment of antennular peduncle. Scaphocerite 4-5 times as long as broad, 0.9-1 times as long as carapace and with distolateral tooth often overreaching distal margin. Basicerite spine well-developed and maximally just reaching to posterior end of lateral margin of scaphocerite.

Maxilliped III without epipod, from just overreaching distal margin of scaphocerite to exceeding by almost entire length of terminal segment; penultimate segment 1.25-1.6 (avg. 1.45) times longer than terminal segment, two segments combined from 0.75 to 1.05 (avg. 0.95) times as long as carapace. Pereiopods lacking epipods; pereopod I rather short, overreaching scaphocerite by about length of chela only and with carpus 0.65-0.75 (avg. 0.7) as long as carapace; pereiopods II subequal and with 18-22 (avg. 20) carpal articles, overreaching scaphocerite by about chela; pereopod III overreaching scaphocerite by 3/5 to whole carpus, with propodus about 0.7 (0.45-

0.85) times as long as carapace and 7-13 (avg. 10) times longer than dactylus, accessory spine of dactylus distinct and situated posterior to terminal spine. Length of various segments progressively longer in posterior two pereopods, except dactyli which become shorter posteriorly. Pereiopod IV overreaching scaphocerite by about 1/2 carpus length and pereiopod V exceeding scaphocerite by less (sometimes much less) than 1/2 carpus, propodus of pereiopod V 0.75-1.3 (avg. 1.1) as long as carapace.

Abdomen with dorsal surface of somite III slightly arched but not sharply angular. Pleura of anterior 3 somites rounded but those of somites IV and V terminating in sharp denticles posteroventrally. Telson, usually armed with 3 pairs of dorsolateral spinules and 3 pairs of distal spines, about 1.2-1.45 (avg. 1.35) times longer than somite VI. Eggs small and numerous, about 0.5 mm in diameter.

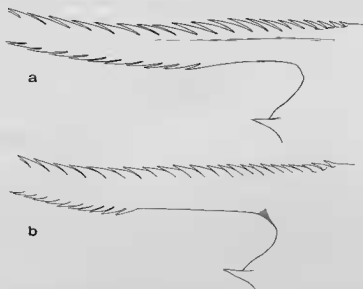


FIG. 2. — Posterior part of rostrum : a, *Plesionika echinicola* sp. nov., ♂ holotype 16.4 mm cl. (MNHN-Na 12614), New Caledonia, CHALCAL 2, stn CP 20, 230 m. — b, *Plesionika quasigrandis* Chace, 1985, ovigerous ♀ 21.8 mm cl. (MNHN-Na 12613), Philippines, MUSORSTOM 3, stn 119, 320-337 m.

Coloration. - Body transparent and somewhat yellowish-green. Rostrum red with basal region above orbit whitish. Dorsal mid-line of carapace with pair of parallel white lines bounded by submedian red stripes (continuous with rostrum). Ventrolateral carapace with narrow white line in anterior half. Short narrow white line also present posterior to antennal spine. Organs visible through carapace somewhat pale green. Dorsal mid-line of abdomen red and flanked by pair of white lines. Lateral surfaces of abdominal somite VI and telson red and flanked by whitish color. Uropods somewhat whitish. Distal three segments of pereopods red. Eyes dark brown. Antennal and antennular flagella white. Eggs pale green to dark green.

SIZE. --- Smallest ovigerous female 10 mm cl. Largest specimen 19 mm cl. (ovigerous female). Specimen of 5.5 mm cl. with rudimentary exopod on maxilliped III.

TYPE-LOCALITY. — New Caledonia.

DISTRIBUTION. — New Caledonia, Loyalty and Chesterfield Islands, in 230 to 540-580 meters. One sample (CHALCAL 1, stn DC 8) is indicated as having been collected in a depth of 40 meters, but the labelling is probably incorrect.

REMARKS. — *P. echinicola* appears to be very abundant in New Caledonia and the Chesterfield Islands and is the dominant species of the *P. narval* group obtained in the area. From a video recorded by submersible, it appears

that this shrimp associates in groups with sea-urchins of the genus *Asthenosoma* (fig. 19). This is probably the first member of the genus known to display such a relationship.

Although *P. echinicola* displays some similarities with *P. quasigrandis*, it is unique in the *P. spinipes* subgroup in having an even greater number of ventral rostral teeth (also a longer rostrum) and shorter thoracic appendages, particularly the carpus of pereopod I. It may be mentioned that one specimen which is tentatively assigned to *P. echinicola* has only 33 ventral rostral teeth.

The pale greenish color of this species is also distinctive in the *P. narval* group. Interestingly, such a color pattern is rather similar to that of *P. ortmanni* Doflein, 1902, from Taiwan (CHAN & YU, in prep.) and Japan (HAYASHI, 1986, fig. 87).

ETYMOLOGY.— This species is named from the Latin for its association (*-cola*) with sea-urchins (*echinus*).

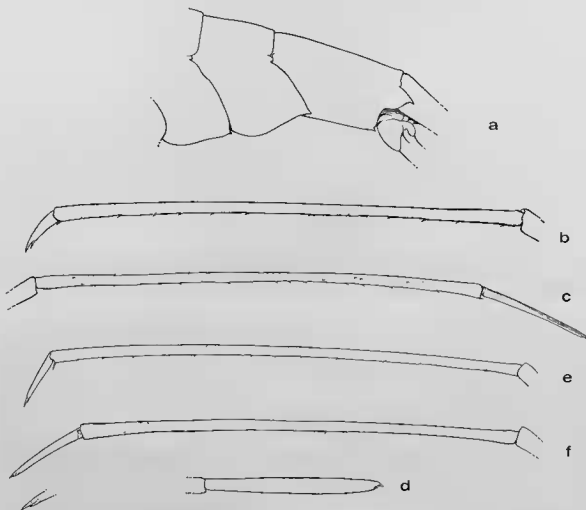


FIG. 3 a. — Abdominal somites IV-VI : *Plesionika echinicola* sp. nov., ♂ holotype 16.4 mm cl. (MNHN-Na 12614), New Caledonia, CHALCAL 2, stn CP 20, 230 m.

FIG. 3 b-f. — Propodus and dactylus of 3rd pereopod : b, *Plesionika echinicola* sp. nov., ♂ holotype 16.4 mm cl. (MNHN-Na 12614), New Caledonia, CHALCAL 2, stn CP 20, 230 m. — c-d, *Plesionika quasigrandis* Chace, 1985, ovigerous ♀ 21.8 mm cl. (MNHN-Na 12613), Philippines, MUSORSTOM 3, stn 119, 320-337 m. — e, *Plesionika spinipes* ♂ 15.0 mm cl. (MNHN-Na 12618), New Caledonia, MUSORSTOM 4, stn 248, 380-385 m. — f, *Plesionika grandis* Doflein, 1902, ovigerous ♀ 20.0 mm cl. (MNHN-Na 12612), Taiwan.

Plesionika quasigrandis Chace, 1985

Figs 2 b, 3 c-d

Plesionika quasigrandis Chace, 1985 : 104, figs 47-48 (type-locality: Philippines). — HANAMURA & TAKEDA, 1987 : 115, fig. 2 d-f.

Parapandalus spinipes - CALMAN, 1939 : 201 *pro parte*, specs from stn 16 only (non Bate, 1888).

? *Pandalus (Parapandalus) spinipes* - ALCOCK, 1901 : 100 (non Bate, 1888).

? *Parapandalus spinipes* - GEORGE & RAO, 1966 : 330. — HOLTHUIS, 1980 : 143, *pro parte*. — BURUKOVSKY, 1982 : 42, *pro parte*.

MATERIAL EXAMINED. — Philippines. "Albatross" 1908-1909 : stn 5194, 11°15'30"N, 124°11'E, 271 m, 3.04.1908 : 1 paratype (NTOU, in exchange from USNM). — Stn 5412, 10°09'15"N, 123°52'E, 296 m, 23.03.1909 : 3 paratypes (MNHN, in exchange from USNM).

MUSORSTOM 1 : stn CC 11, 13°59.8'N, 120°23.7'E, 217-230 m, 20.03.1976 : 1 spec.

MUSORSTOM 3 : stn CP 119, 11°59'N, 121°13'E, 320-337 m, 3.01.1985 : 2 specs (one illustrated, MNHN-Na 12613). — Stn CP 143, 11°29'N, 124°11'E, 205-214 m, 7.07.1985 : 7 specs.

Java Sea. 7°46'S, 114°28'E, 6.09.1909 : 4 specs (RMNH).

India. Cape Comorin, 225 m, no date and station : 2 specs. — Cochin, 24.03.1979 : 3 specs (RMNH).

Gulf of Aden. JOHN MURRAY EXP., stn 16, 10°29'48"N, 45°01'48"E, 186 m, 2.09.1933 : 4 specs (BMNH 1939.10.9.181-190).

20.02.1979 : 6 specs (RMNH).

DIAGNOSIS. — Body size usually large. Rostrum 1.35-1.75 times as long as carapace, directed slightly dorsad and armed with 41-53 dorsal teeth, including 4-7 teeth on post-rostral ridge of carapace, ventral margin with 32-44 teeth, posterior 10 ventral teeth corresponding to 5.5-8 dorsal teeth. Dorsal end of orbital margin slightly truncate. Stylocerite sharply acute and with outer margin barely curving upward. Scaphocerite 0.8-0.95 (avg. 0.85) times as long as carapace. Maxilliped III without epipod, penultimate segment 1.25-1.65 (avg. 1.4) times longer than terminal segment, two segments combined 1-1.2 (avg. 1.15) times as long as carapace. Carpus of pereopod I 0.85-0.95 (avg. 0.9) times as long as carapace; pereopods II subequal with 19-32 carpal articles; dactylus of pereopod III 1/3-1/7 times as long as propodus, somewhat paddle-shaped with accessory spine extremely minute and situated next to terminal spine. Abdominal pleura IV and V pointed. Telson 1.25-1.4 times longer than abdominal somite VI.

Coloration. - Not known.

SIZE. — Smallest ovigerous female 19.8 mm cl. (CHACE, 1985). Maximum size 26 mm cl. (ovigerous female, CHACE, 1985). Maximum size in the present study, 25.5 mm cl. (male).

DISTRIBUTION. — Indo-West Pacific, from Philippines to Gulf of Aden, in 186 to 348 meters.

REMARKS. — *P. quasigrandis* closely resembles *P. grandis* and CHACE (1985) found differences only in the number of ventral rostral teeth (20 to 31, usually 24 to 28, in *P. grandis*, 32 to 44, usually 34 to 38, in *P. quasigrandis*) and the proportional length of the distal two segments of maxilliped III (penultimate segment from slightly more than 1.5 to slightly more than 1.75 times as long as the terminal one in *P. grandis*, penultimate segment usually shorter, only 1.25 to 1.4 times as long as the terminal one in *P. quasigrandis*). Occasionally the number of ventral rostral teeth in *P. grandis* is more than 31 and can be as high as 35. In other respects, the penultimate and terminal segments of maxilliped III of a paratype kindly provided by F. A. CHACE and one of the MUSORSTOM specimens have a ratio of 1.65 and 1.5 respectively. Nevertheless, the relative spacing of the rostral teeth on the dorsal and ventral borders indicates a clear distinction between the two forms (similarly HANAMURA and TAKEDA, 1987, used the number of ventral rostral teeth along the length of the scaphocerite as an index). In *P. quasigrandis*, the ventral rostral teeth are distinctly more closely packed than those on the dorsal border (ie. 10 ventral teeth to 5.5-8, avg. 6.5, dorsal teeth, fig. 2 b) while the dorsal teeth are usually more closely set in *P. grandis* (10 lower to 9-14 upper, CHACE, 1985, fig. 28). Moreover, the size of *P. quasigrandis* is generally much

larger and the body more robust than in *P. grandis* in this study, though CHACE (1985) mentioned that the maximum size of *P. grandis* is greater than that of *P. quasigrandis*. *P. grandis* was collected at many more stations and in greater numbers than *P. quasigrandis* during the MUSORSTOM cruises in the Philippines, in contrast to the "Albatross" expedition which found the latter species more generally prevalent.

The present species is widely distributed in the Indo-West Pacific. An examination of Nationaal Natuurhistorisch Museum material labelled as "*P. spinipes*" from various localities in the Indian Ocean, showed that they are actually all *P. quasigrandis*. It is the same with specimens from station 16 of the John Murray Expedition caught in the Gulf of Aden and identified to *P. spinipes* by CALMAN (1939). The limited material examined from India in this study is all *P. quasigrandis*. From the distribution of the species, ALCOCK (1901) and GEORGE & RAO (1966)'s specimens are probably not *P. spinipes* but it is not certain that they are *P. quasigrandis* or *P. grandis*.

Plesionika spinipes Bate, 1888

Figs 1 b-c, 3 e, 21

- Plesionika spinipes* Bate, 1888 : 646, pl. 113, fig. 2 [type-locality : north of New Guinea]. — CHACE, 1985 : 46, fig. 30. — KENSLEY, TRANTER & GRIFFIN, 1987 : 319.
- Pandalus (Parapandalus) serratifrons* Borradaile 1900 : 411, *pro parte*.
- Parapandalus spinipes* - DE MAN, 1920 : 142, pl. 12, fig. 33 a, c-e, pl. 13, fig. 33, 33b. — HOLTHUIS, 1980 : 143, *pro parte*. — BURUKOVSKY, 1982 : 42, *pro parte* (in key).
- Not *Parapandalus spinipes* - OSHIMA, 1921 : 33 (= *P. yui* sp. nov.). — MAKI & TSUCHIWA, 1923 : 65, pl. 6-3 (= *P. yui* sp. nov.). — CALMAN, 1939 : 201 [= *P. narval* (Fabricius, 1787), *P. quasigrandis* Chace, 1985, *P. grandis* Doflein, 1902]. — MASUDA & HATA, 1969 : 90, 3 unnumbered photos in color. — KUBO, 1971 : 611, fig. 958. — SUZUKI, 1974 : 27, fig. 1 a. — MIYAKE, 1975 : 100, photo in color; 1982 : 61, pl. 21-1 in color. — MATSUZAWA, 1977, pl. 69, fig. 4 in color. — TAKEDA, 1982 : 20, fig. 59, cover color photo [All = *P. narval* (Fabricius, 1787)].
- Not *Plesionika spinipes* - TAKEDA, 1986 : 107, photo in color [= *P. narval* (Fabricius, 1787)].
- ? Not *Pandalus (Parapandalus) spinipes* - ALCOCK, 1901 : 100 (= ? *P. quasigrandis* Chace, 1985 or *P. grandis* Doflein, 1902).
- ? Not *Parapandalus spinipes* - GEORGE & RAO, 1966 : 330 (= ? *P. quasigrandis* Chace, 1985 or *P. grandis* Doflein, 1902).

MATERIAL EXAMINED. — North of New Guinea. "Challenger" : stn 219, 1°54'0"S, 146°39'40"E, 274 m, 10.03.1875 : 9 carapaces, 10-13 mm and 8 abdomens (probably all males), syntypes (BMNH).

New Britain, Blanche Bay, 91-183 m, 15.07.1895 (trawl) and 19.05.1897 (*Nautilus* food, 183 m) : 1 ♂, 2 spec sex unknown, 7-11.5 mm [*pro parte* syntypes of *Pandalus (Parapandalus) serratifrons* Borradaile 1900 (UMZC)].

Chesterfield Islands, CHALCAL 1 : stn CP 4, 19°33.9'S, 158°37.9'E, 350-370 m, 16.07.1984 : 20 specs.

MUSORSTOM 5 : stn CP 307, 22°11.07'S, 159°24.07'E, 345-350 m, 12.10.1986 : 1 spec. — Stn CP 309, 22°10.20'S, 159°22.80'E, 340 m, 12.10.1986 : 1 spec. — Stn CP 316, 22°25.13'S, 159°24.00'E, 330 m, 13.10.1986 : 1 spec. — Stn CP 373, 19°52.92'S, 158°38.66'E, 380-390 m, 20.10.1986 : 4 specs.

New Caledonia, BIOCAL : stn CP 78, 22°16.25'S, 167°15.53'E, 445-450 m, 5.09.1985 : 3 specs. — Stn CP 105, 21°30.71'S, 166°21.72'E, 310-330 m, 8.09.1985 : 47 specs. — Stn CP 110, 22°12.38'S, 167°06.43'E, 275-320 m, 9.09.1985 : 14 specs.

MUSORSTOM 4 : stn CP 171, 18°57.8'S, 162°14.0'E, 425 m, 17.09.1985 : 16 specs. — Stn CP 172, 19°01.2'S, 163°16.0'E, 275-330 m, 17.09.1985 : 22 specs (USNM). — Stn CP 193, 18°56.3'S, 163°23.2'E, 415 m, 19.09.1985 : 1 spec. — Stn CC 247, 22°09.0'S, 167°13.3'E, 435-460 m, 4.10.1985 : 2 specs. — Stn CC 248, 22°09.5'S, 167°10.0'E, 380-385 m, 4.10.1985 : 27 specs. (one illustrated, MNHN-Na 12618).

Loyalty Islands, MUSORSTOM 6 : stn CP 409, 20°41.05'S, 167°07.25'E, 385 m, 15.02.1989 : 24 specs. — Stn CP 464, 21°02.3'S, 167°31.6'E, 430 m, 21.02.1989 : 19 specs.

French Polynesia, SMCB (J. POUPIN coll.) : Society Islands, *Tahiti*, trap, 11.10.1978 : 2 specs. — *Taravaa*, 17°47'S, 149°21'W, 500-600 m, trap, 11.12.1988 : 13 specs. — *Maiaa*, 17°38.6'S, 150°39'W, 320 m, trap, 7.08.1989 : 1 spec. (illustrated, MNHN-Na 12617).

DIAGNOSIS. — Rostrum directed slightly dorsad and 1.6-2.3 (avg. 1.9) times longer than carapace, with 39-57 (mostly 46-54) dorsal teeth and 24-36 (avg. 27) ventral teeth, posterior 10 ventral teeth corresponding to 12-21 dorsal teeth. 4-6 post-rostral teeth present on carapace, posterior to orbital margin. Dorsal end of orbital margin slightly truncate. Stylocerite sharply acute and with outer margin not curved upwards. Scaphocerite 0.9-1.05 times as long as carapace. Maxilliped III without epipod, penultimate segment 1.6-2 (avg. 1.8) times longer than terminal segment, two segments combined 0.95-1.3 times as long as carapace. Carpus of pereopod 1 0.85-1.05 (avg. 0.95) times longer than carapace.

0.95) times as long as carapace; pereopods II subequal and with 21-28 carpal articles; pereopod III with propodus 0.8-1.15 (avg. 0.9) times as long as carapace, dactylus elongated and conical, 1/7-1/13 (avg. 1/9.5) times as long as propodus and with accessory spine small and situated next to terminal spine. Abdominal pleura IV and V sharply pointed. Telson 1.1-1.3 times longer than abdominal somite VI.

Coloration. - According to the two photographs we have, the coloration seems very similar to that of *P. grandis* but the stripes on the body seem to be slightly wider. Moreover, the extension of the median abdominal stripe on the carapace is a curve descending and then ascending.

SIZE. - Smallest ovigerous female 12.5 mm cl., largest specimen an ovigerous female of 18.5 mm cl.

DISTRIBUTION. - Only known with certainty from Eastern Australia, Kai Islands, north of New Guinea (Admiralty Islands), New Britain, Chesterfield Islands, New Caledonia, Loyalty Islands and French Polynesia, in 91-183 to 500-600 meters.

REMARKS. - The type series of *P. spinipes* collected by the "Challenger" which was received from the British Museum consisted of 9 damaged young specimens (10-13 mm cl.), all with their rostra broken and dactyli missing. Of the 6 syntypes still with a portion of rostrum attached to the carapace, the one with the longest portion has 8 ventral teeth which correspond to 12.5 dorsal teeth. In the others, the ratios are 6-10 (x 2), 5-8, 5-7 and 3-4 (also see illustration of a syntype by CHACE, 1985, fig. 30). Only 2 mid-portions and one anterior portion of rostrum pieces were found in the jar containing the type material. From the above 6 specimens, the number of dorsal rostral teeth that can possibly correspond with 10 posterior ventral teeth is 14-17. In the type series of *P. serratifrons* also caught in New Britain, there are three small *P. spinipes* specimens (also lacking dactyli in the posterior three pereopods); two still have their rostra which have more than 10 ventral teeth (1 entire) and the posterior 10 ventral teeth correspond to 15 and 16 dorsal teeth. Thus, it appears that the material from New Caledonia, Loyalty and Chesterfield Islands, with the posterior 10 ventral teeth corresponding to an average of 15.5 (12-18) dorsal teeth (fig. 1 b), is very similar to the typical form. The other meristic characters of the New Caledonia, Loyalty and Chesterfield Islands population are also similar to those of the type series.

The material from French Polynesia, however, has the ventral rostral teeth spaced even further apart than the dorsal ones, and with the posterior 10 ventral teeth corresponding to 18.5-21 (avg. 20) upper teeth (fig. 1 c). The number of dorsal rostral teeth is also generally higher: 48-57 (avg. 54) while it is 39-54 (avg. 46) in the New Caledonian population.

As will be discussed in *P. grandis*, the specimens identified to *P. spinipes* by DE MAN (1920) should be more similar to *P. spinipes* than to *P. grandis*. Unless specimens with intermediate characters in both the length of the dactylus of pereopod III and the relative spacing between the dorsal and ventral rostral teeth are found, the two forms can be treated as distinct. The material from New South Wales reported by KENSLEY, TRANTER and GRIFFIN (1987) also appears to be the true *P. spinipes*. Although *P. spinipes* has often been cited in the Indo-West Pacific (e.g. CALMAN, 1939; KUBO, 1971; HOLTHUIS, 1980; BURUKOVSKY, 1982), the species is only known with certainty in the South-West Pacific. The colorations of *P. spinipes* and *P. grandis* are very similar. But the description of the color of *P. spinipes* is only based on several photographs. A comparison of fresh material may reveal more differences between the two.

In the New Caledonia, Loyalty and Chesterfield Islands samples, *P. spinipes* is the second most abundant species of the *P. narval* group. It can be distinguished readily from *P. echincola* by having fewer more widely spaced ventral rostral teeth and a longer carpus in pereopod I.

Plesionika grandis Doflein, 1902

Fig. 3 f, 22

Plesionika spinipes var. *grandis* Doflein, 1902 : 618, pl. 3, figs 3-5 (type-locality : Sagami Bay, Japan). — DE MAN, 1920 : 145.

Parapandalus spinipes var. *grandis* - BALSS, 1914 a : 31.

Parapandalus spinipes grandis - YOKOYA, 1933 : 20 [? mixed with *P. narval* (Fabricius, 1787)].

Plesionika grandis - CHACE, 1985 : 66, figs 28-29. — HAYASHI, 1986 : 133, pl. 83. — HANAMURA & TAKEDA, 1987 : 110, fig. 2 a-c.

Parapandalus spinipes - CALMAN, 1939 : 201, *pro parte*, specs stn 105 B only. — HOLTHUIS, 1980 : 143, *pro parte* (non Bate, 1888).

? *Pandalus* (*Parapandalus*) *spinipes* - ALCOCK, 1901 : 100 (non Bate, 1888).

? *Parapandalus spinipes* - GEORGE & RAO, 1966 : 330. — BURUKOVSKY, 1982 : 42, *pro parte* (in key) (non Bate, 1888).

MATERIAL EXAMINED. — Taiwan. Commercial trawler, Ta-Chi, I-Lan County : 10.04.1983 : 1 spec. (NTOU). — 31.12.1984 : 1 spec. (NTOU). — 16.03.1985 : 1 spec. (NTOU). — 16.04.1985 : 3 specs (NTOU). — 8.05.1985 : 5 specs (NTOU). — 14.05.1988 : 6 specs (NTOU). — 21.05.1988 : 3 specs (NTOU). — 4.06.1988 : 2 specs (NTOU). — 9.01.1989 : 5 specs (NTOU). — 17.08.1989 : 2 specs (one drawn, MNHN-Na 12612).

Su-Aou, I-Lan County : 16.03.1985 : 2 specs (NTOU).

Tong-Kong, Ping-Tong County : 07.1975 : 4 specs (NTOU). — 31.10.1984 : 1 spec. (NTOU). — 2.12.1984 : 1 spec. (NTOU). — 7.05.1988 : 1 spec. (NTOU). — 29.10.1988 : 1 spec. (NTOU). — 19.01.1989 : 3 specs (NTOU).

Philippines. MUSORSTOM 1 : stn CP 4, 14°01.8'N, 120°17.2'E, 182-194 m, 19.03.1976 : 13 specs. — Stn CP 5, 14°01.5'N, 120°23.5'E, 200-215 m, 19.03.1976 : 18 specs. — Stn CP 9, 14°01.8'N, 120°17.6'E, 180-194 m, 19.03.1976 : 13 specs. — Stn CP 10, 13°59.8'N, 120°18.2'E, 187-205 m, 19.03.1976 : 9 specs. — Stn CC 11, 13°59.8'N, 120°23.7'E, 217-230 m : 26 specs. — Stn CP 20, 13°59.2'N, 120°20.3'E, 208-222 m, 21.03.1976 : 5 specs. — Stn CP 36, 14°01.2'N, 120°20.2'E, 187-210 m, 23.03.1976 : 10 specs. — Stn CP 51, 13°49.4'N, 120°04.2'E, 170-200 m, 25.03.1976 : 9 specs. — Stn CC 69, 13°58.8'S, 120°17.3'E, 187-199 m, 27.03.1976 : 8 specs.

MUSORSTOM 3 : stn CP 92, 14°03.0'N, 120°11.5'E, 224 m, 31.05.1985 : 38 specs. — Stn CP 96, 14°00.3'N, 120°17.3'E, 190-194 m, 1.06.1985 : 23 specs. — Stn CP 101, 14°00.15'N, 120°19.25'E, 194-196 m, 1.06.1985 : 11 specs. — Stn CP 103, 14°00'N, 120°18'E, 193-200 m, 1.06.1985 : 64 specs. — Stn CP 120, 12°05.6'N, 121°15.6'E, 219-220 m, 3.06.1985 : 75 specs.

Indonesia. "Albatross" : stn 5580, 04°52'45"N, 119°06'45"E, Sabah, off Darvel Bay, 296 m, 25.09.1909 : 3 specs (MNHN, in exchange with USNM).

Zanzibar area. JOHN MURRAY EXP. : stn 105 B, 5°34'24"N, 39°14'06"E, 238 m, 11.01.1934 : 4 specs. (BMNH 1939.10.9.191-199).

Madagascar. "Vauban" : stn CH 47, 15°20.0'S, 46°11.8'E, 245-250 m, 7.11.1972 : 15 specs. — Without data : 22 specs.

DIAGNOSIS. — Rostrum directed slightly dorsad and 1.4-2 (avg. 1.7) times as long as carapace, with 26-51 (avg. 41) dorsal and 19-35 (avg. 26) ventral teeth, posterior 10 ventral teeth corresponding to 9-14 (avg. 11.5) dorsal teeth. Post-rostral carina on carapace with 4-6 teeth. Dorsal end of orbital margin slightly truncate. Stylocerite sharply acute and with outer margin not curved upward. Scaphocerite slightly shorter than carapace. Maxilliped III without epipod, with penultimate segment 1.55-1.85 (avg. 1.65) times longer than terminal segment, two segments combined more or less as long as carapace. Pereiopod I exceeding scaphocerite by 1/2-1/3 carpus and with carpus 0.9-1 (avg. 0.95) times as long as carapace; pereopods II subequal and with 18-33 (avg. 23) carpal articles; propodus of pereiopod III 0.7-0.95 (avg. 0.85) times as long as carapace, dactylus elongated conical or somewhat paddle-shaped, 1/4-1/7 (avg. 1/5) times as long as propodus, with accessory spine minute and situated next to terminal spine. Abdominal pleura IV and V pointed. Telson 1.1-1.4 times longer than abdominal somite VI.

Coloration. — Body generally pinkish and slightly transparent, with four very narrow longitudinal red stripes on each side of abdomen : subdorsal stripe ends at posterior part of third abdominal somite, upper lateral one ends at posterior border of fourth abdominal somite, the median one runs along the six somites and the telson, the lower runs to the sixth abdominal somite. These stripes extend onto the carapace in a very obscure way; sometimes they are indiscernible, sometimes they are slightly marked, but do not slope down to the ventral border. Rostrum pinkish with margins red, color deeper at upper border. Carapace sometimes very red. Organs visible through carapace vermilion, dark brown or pale blue. Eye black-brown. Pereiopods with proximal segments somewhat whitish but becoming red distally. Eggs light blue becoming whitish when near hatching.

SIZE. — Smallest ovigerous female 13 mm cl. Maximum size 30.8 mm cl. (CHACE, 1985). Largest specimen in the present study 22.5 mm cl. (ovigerous female).

DISTRIBUTION. — Indo-West Pacific but only known with certainty from Japan, Taiwan, Philippines, Indonesia, N. W. Australia, Zanzibar area and Madagascar, in 110 to 375 meters.

REMARKS. — The taxonomic status of *P. grandis* is rather controversial in its relationship to *P. spinipes* (see DOFLEIN, 1902; DE MAN, 1920; CHACE, 1985). The types of *P. grandis* may have been deposited at the Zoologische Staatssammlung in München but are no longer there and it seems that they were destroyed at the end of the second World War (L. TIEFENBACHER *in litt.*) and those of *P. spinipes* are all incomplete. After examining a fairly large number of specimens from different localities in the Indo-West Pacific and numerous apparently typical *P. spinipes* specimens from New Caledonia, Loyalty and Chesterfield Islands, two major differences concerning the length of the dactyli of pereopods and the spacing of the rostral teeth were found between the two forms. Thus, it seems justified to continue treating the two forms as separate species.

Although DE MAN (1920) regarded *P. grandis* as a synonym of *P. spinipes*, he had noticed that his material from the Kai Islands was different from the Japanese material in the size of the dactyli of the posterior pereopods. The types of *P. spinipes* all have their dactyli missing but W.T. CALMAN (*in DE MAN*, 1920) stated that the propodus of the pereopod IV is 14.5 times longer than the dactylus in one of the syntypes. All of the South-West Pacific material in this study have the dactylus of pereopod III less than 1/7 (avg. 1/9) the length of the propodus (fig. 3 e). In contrast, specimens from Japan (also see HAYASHI, 1986), Taiwan, the Philippines and Madagascar have the dactylus of pereopod III more than 1/7 (avg. 1/5) the length of the propodus and sometimes even paddle-shaped (fig. 3 f). The relative spacing of the teeth on the dorsal and ventral borders of the rostrum noted by CHACE (1985) is also a useful character to distinguish the two species, though this character may overlap in about 10% of specimens. Generally, the posterior 10 ventral rostral teeth correspond to no more than 13 dorsal teeth in *P. grandis* but to more than 13 in *P. spinipes*. The figure provided by DE MAN (1920) of the specimen from the Kai Islands also shows that the ventral rostral teeth are distinctly more widely spaced than the dorsal ones and contrary to CHACE (1985), we think that there is little doubt that DE MAN's specimens are true *P. spinipes*.

The degree of projection of the distolateral tooth of the scaphocerite varies in both species, as well as in other species of the *P. narval* group, and cannot be used to distinguish between *P. grandis* and *P. spinipes* contrary to the suggestion of CHACE (1985).

It seems that most Japanese authors have previously treated all their material of the *P. narval* group as *P. spinipes* (see synonymy for *P. narval* and HAYASHI, 1986) and it is not clear whether there has also been a mix up of *P. grandis* and *P. narval* in YOKOYA (1933). Since YOKOYA (1933) mentioned that his specimens had more than 40 dorsal rostral teeth and some of them came from less than 100 m depth, it is highly likely that at least some were *P. narval*.

P. grandis appears to be quite common wherever it occurs. In Taiwan this, if not abundant, is perhaps the most common *Plesionika* species and is sometimes sold in the market with a price of about NT 100/kg (i.e. about US \$ 4/kg) under a common name "mother shrimp", because it usually carries numerous brightly colored eggs on the abdomen.

Plesionika longicauda (Rathbun, 1901)

Figs 4 a, 5 a-b, d, f, 38, 39

Pandalus longicauda Rathbun, 1901 : 117, fig. 24 [type-locality: Gulf of Mexico].

Parapandalus longicauda - DE MAN, 1920 : 140 (in key). — PEQUEGNAT, 1970 : 86. — BURUKOVSKY, 1982 : 41 (in key). — TAKEDA, 1983 : 64, photo in color.

Parapandalus narval - CROSNIER & FOREST, 1973 : 221, fig. 69 a. — HOLTHUIS, 1951 : 68; 1980 : 142, *pro parte*. — LAGARDÈRE, 1981 : PANDL Parapand 1, 1 unnumb. fig. *pro parte* (non Fabricius, 1787).

Plesionika escaittis - LEMAÎTRE & GORE, 1988. : 383, figs 1, 2, 3 A-J, 4 (non Stimpson, 1860).

MATERIAL EXAMINED. — Eastern Atlantic, Senegal, 12°32'N, 17°34'W, 95 m, 23.05.1979 : 1 spec. — Liberia, "Calypso" : stn 15, 4°34.3'N, 8°91.0'W, 64 m, 20.05.1956 : 1 spec. — G.T.S. I : stn 20, 4°24.0'N, 7°08.3'W, 70 m, 20.10.1963 : 1 spec. — Ivory Coast, G.T.S. I : stn 19, 4°14'N, 7°49' W, 100 m, 23.10.1963 : 1 spec. — Gabon, "Ombango", 150 m, 3.01.1959 : 2 specs. — "Geronimo" : stn 2-184, 0°30.5'S, 8°43.0'E, 101 m, 1.09.1963 : 9 specs. — Congo, "Ombango", off Pointe-Noire, 156-400 m, 2.05.1969 : 37 specs. — Angola: "Ombango",

Cruise 13, sta 308, Grand Schmidt 9, 3°36'S, 9°12' E, 500 m, 16.06.1960 : 1 spec. — Cruise 14, sta 375, Grand Schmidt 106, 10°10'S, 12°45'E, 0-300 m, 10.04.1961 : 1 spec.

Western Atlantic. Bahamas, New Providence Island, 25°00.21'N, 77°26.1'W, 143 m, 31.03.1981 : 2 specs (RMNH).

DIAGNOSIS. — Rostrum 1.7-2.1 (avg. 1.85) times as long as carapace, with basal region horizontal or slightly upturned but lacking ventral notch, curved slightly and directed dorsad, armed with 36-46 (avg. 39) dorsal and 25-33 (avg. 29) ventral teeth, rostral teeth somewhat well-spaced and with posterior 10 ventral teeth corresponding to B-10.5 (avg. 9) dorsal teeth. Carapace with 3-4 post-rostral teeth. Dorsal end of orbital margin not truncate. Stylocerite sharply acute and with outer margin barely curving upward. Scaphocerite usually slightly shorter than carapace. Maxilliped III without epipod, penultimate segment 1.3-1.55 (avg. 1.4) times longer than terminal segment, two segments combined 1.1-1.35 (avg. 1.25) times as long as carapace. Pereiopods also without epipods; carpus of pereopod I 0.95-1.15 (avg. 1.05) times as long as carapace; pereopods II subequal and with 18-26 (avg. 24) carpal articles; propodus of pereopod III about 1.2 times as long as carapace and 10 times longer than dactylus, accessory spine of dactylus distinct and situated posterior to terminal spine. Abdominal pleuron IV rounded but V pointed. Abdominal somite VI with longitudinal dorsal groove more or less pronounced. Telson more or less as long as abdominal somite VI in adults.

Coloration. - Body transparently whitish and covered with red stripes. Abdomen with 3 pairs of longitudinal red stripes; subdorsal stripe ending at posterior margin of somite III, middle one running to telson and ventral one ending at posterior margin of somite VI. Four white lines also present between darker rays (but disappearing when taken out of water). Stripes from abdomen abruptly curving downwards on the carapace. A transverse red-margined white stripe present behind orbit and ending at about mid-carapace. Rostrum red. Eyes black-brown. Antennal and antennular flagella white (but becoming red when taken out of water). Pereiopods somewhat reddish and with white dots.

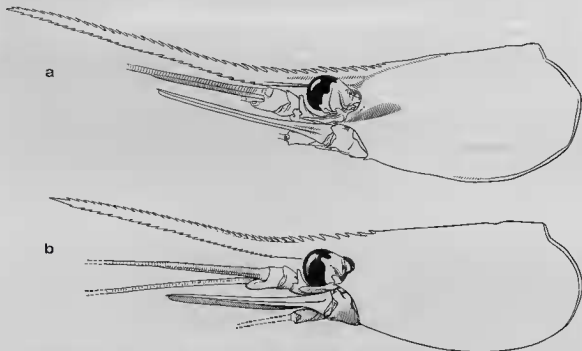


FIG. 4 a-b. — Carapace and anterior appendages : a, *Plesionika longicauda* (Rathbun, 1901), ovigerous ♀ 13.9 mm cl., Congo, off Pointe-Noire, 150-400 m (After CROSNIER & FOREST, 1973). — b, *Plesionika yui* sp. nov., ovigerous ♀ paratype 15 mm cl. (MNHN-Na 12623), Taiwan, Tong-Kong, about 130 m.

SIZE. — Smallest ovigerous female 12 mm cl. Largest specimen 18 mm cl. Specimen of 8.5 mm cl. with rudimentary exopod on maxilliped III.

DISTRIBUTION. — Western Atlantic : Gulf of Mexico and Caribbean Sea to off Suriname. Eastern Atlantic from south of Senegal to Angola. In 55 to 500 meters.

REMARKS. — The description of the present form is based mainly on the material from the Congo (the same as that described in CROSNIER & FOREST, 1973), because specimens from the other eastern Atlantic localities are small and not in good condition. Nevertheless, all of them completely lack an epipod on maxilliped III and are similar in general appearance. It is interesting that specimens from southern Senegal lack an epipod on maxilliped III but those from Cape Verde Islands and further north all have well-developed epipods. The present form probably does not extend north of Senegal in the eastern Atlantic. Thus the material from Guinea reported by HOLTTHUIS (1951) should be referred to the present species rather than to *P. narval*. LEMAITRE and GORE (1988) reported that specimens from St. Helena have an epipod on maxilliped III but it is generally agreed that the fauna in St. Helena is very atypical in the Atlantic.

CHACE (1985) argued that the name *P. escatilis* may need to be revived for the present form which lacks an epipod on maxilliped III. This opinion was subsequently followed by LEMAITRE and GORE (1988). They claimed that the dry syntypes of *P. escatilis* also lacked an epipod on maxilliped III, though all the alcohol material they examined from the same locality (Madeira Island) had an epipod on maxilliped III. A reexamination of the two syntypes in The Natural History Museum showed that the larger specimen has a small remnant of an epipod at the left maxilliped III (it is pinned on the left side). On the right side, which is obscured by the ventral carapace and pereopod II, there is an apparently partly broken epipod. In the smaller specimen, both maxillipeds III possess an almost entire epipod. The rostrum of the larger specimen is still entire and has 63 (3 on carapace) dorsal teeth and 43 ventral teeth, with the posterior 10 ventral teeth corresponding to 11.5 dorsal teeth. The smaller specimen has the rostrum broken but the posterior 10 ventral teeth correspond to 12.5 dorsal teeth. All these characters are typical of those of *P. narval* from the same area and therefore *P. escatilis* should be considered as a synonym of the former.

Although CHACE (1985) mentioned that there are probably some differences between the eastern and western Atlantic populations, LEMAITRE and GORE (1988) concluded that both populations are the same. An examination of two specimens from the Bahamas shows that they are very similar to the eastern population with the number of rostral teeth being only slightly higher. The posterolateral angle of the abdominal pleuron IV, stated as pointed by LEMAITRE and GORE (1988), is actually rounded (fig. 5 a-b). The telson has 3 dorsolateral spinules (as in the other species of the *P. narval* group) rather than 4 as stated by the same authors. An examination of the two syntypes of *P. longicauda* (both about 6 mm cl.) by F. A. CHACE revealed that the one with an intact rostrum has 43 dorsal teeth (2 on carapace) and 30 ventral teeth. As far as the epipods on maxilliped III are concerned, F. A. CHACE wrote "Although I am reasonably sure that the third maxilliped of *P. longicauda* lacks an epipod, it is not impossible to miss one in specimens of such small size". The other characters of *P. longicauda* provided by RATHBUN (1901), PEQUEGNAT (1970) and TAKEDA (1983) are also almost identical to those of the Congo material (fig. 4 a). The "spine" (or protuberance) at the posterior sixth of the carapace, stated by RATHBUN as the diagnostic character of the species, is quite commonly a variable character in the genus (e.g. GEORGE & RAO, 1966 : 330; CROSNIER & FOREST, 1973, fig. 69) and this is also apparent in the Congo material. The distal two segments of maxilliped III, described as subequal for *P. longicauda*, may not be very different, since the smallest ratio for these is 1.3 in the material of the present study. Obviously the name of the species has been based on the great length of the sixth abdominal somite, but this character is not in fact unique to the species but is explained rather by the small size (cl. = 6 mm) of the types; one knows that in all the species of the group, the sixth abdominal somite is longer in the juveniles than in the adults (fig. 5 a & 5 b).

Nevertheless, F. A. CHACE informed us that abdominal somite VI in the syntypes of *P. longicauda* bears a distinct longitudinal groove which is likely not an artifact of fixation. Such a groove, however, is absent in the specimens assigned by LEMAITRE and GORE (1988) to *P. escatilis* (which were also examined by him). Thus

CHASE was not certain whether they could be assigned to *P. longicauda* or not. However we found that the West African material includes both forms; some with a marked longitudinal groove on abdominal somite VI while some only with a faint suggestion of one. As the syntypes are very small juveniles (still possessing some remains of exopods at the pereopods), we have only slight reservations in identifying the present form as *P. longicauda*.

Interestingly the present species, in its meristic characters is quite different from the *P. narval* specimens from Monaco and the Mediterranean but more similar to the specimens from the Philippines that we assign to *P. narval* (also see CHACE, 1985), in having a shorter rostrum and fewer rostral teeth (see the section on *P. narval* in this paper). Moreover, the rostral teeth in the present form are generally fewer and more spaced than in *P. narval* (fig. 5 a, d). The color pattern on the carapace is also very different in *P. longicauda*. Like *P. narval*, this species also appears to live in shoals (LEMAITRE & GORE, 1988).

Plesionika yui sp. nov.

Figs. 4 b, 5 c, e, g-h. 23

Parapandalus spinipes - OSHIMA, 1921 : 33. — MAKI & TSUCHIYA, 1923 : 65, pl. 6-3 (non Bate, 1888).

MATERIAL EXAMINED. — Taiwan. Commercial trawler : Tong-Kong, Ping-Tong County (S.W. Taiwan), Jul. 1975 : 1 ovigerous ♀ 16 mm, 1 ♀ 17.5 mm (NTOU). — *Ibidem*, 28.07.1985 : 1 ♂ 14 mm, 1 ovigerous ♀ 19.5 mm (NTOU). — *Ibidem*, 7.05.1988 : 2 ♂ 12 mm, 1 ♀ 11 mm (Paratypes, MNHN-Na 12624). — *Ibidem*, 29.10. 1988 : 1 ♂ 10 mm. — *Ibidem*, 19.01.1989 : 15 ♂ 9.5-14 mm, 21 ovigerous ♀ 13-19 mm, 19 ♀ 6.5-16 mm (Holotype and paratypes, NTOU); 3 ovigerous ♀, 15-17 mm (Paratypes, MNHN-Na 12623, one illustrated).

TYPES. — *Holotype* : 1 ovigerous ♀ 18.5 mm cl., Taiwan, Tong-Kong, Ping-Tong County, 19.01.1989 (NTOU). *Paratypes* : 15 ♂ 9.5-14 mm cl., 20 ovigerous ♀ 13-19 mm cl., 19 ♀ 6.5-16 mm cl. (NTOU); 3 ovigerous ♀, 15-17 mm (MNHN-Na 12623), *ibidem* and same date. — 2 ♂ 12 mm, 1 ♀ 11 mm (MNHN-Na 12624), *ibidem*, 7.05.1988.

DIAGNOSIS. — Rostrum directed somewhat dorsad, 0.95-1.85 times as long as carapace and armed with 26-45 dorsal teeth and 18-40 ventral teeth, posterior 10 ventral teeth corresponding to 4-8 dorsal teeth. 2-3 post-rostral teeth present. Dorsal end of orbital margin not truncate. Stylocerite sharply acute and with outer margin slightly curving upward. Scaphocerite approximately as long as carapace. Maxilliped III with rudimentary epipod, penultimate segment 1.4-1.6 times longer than terminal segment, two segments combined slightly longer than carapace. Carpus of pereopod I 1-1.25 times as long as carapace; pereopods II subequal and with 21-38 carpal dactyls; propodus of pereopod III 0.7-1.05 times as long as carapace and 2.5-4.5 times longer than dactylus; dactylus paddle-shaped and with minute accessory spine next to terminal spine. Abdominal pleuron IV rounded but V pointed. Telson always slightly longer than abdominal somite VI.

DESCRIPTION. — Rostrum with basal region curved slightly upwards and sometimes with depression at posterior end of ventral border, directed somewhat dorsad and sometimes recurving slightly downwards again at anterior, 0.95-1.85 (avg. 1.5) times as long as carapace, armed on dorsal border with 26-45 (avg. 36) closely-set teeth, ventral border with 18-40 (avg. 28) teeth, posterior 10 ventral teeth corresponding to 4-7.5 (avg. 5.5) dorsal teeth. Post-rostral carina on carapace with 2-3 teeth, posteriormost 1-2 sometimes with faint basal suture. Eye spherical and with distinct ocellus. Orbital margin generally concave and with dorsal end continuous and not truncate. Antennal, pterygostomial and basicerite spines well-developed. Stylocerite sharply acute and with outer margin slightly curving upward. Scaphocerite more or less as long as carapace. Antennal and antennular flagella very long.

Maxilliped III with very faint remnant of epipod, overreaching scaphocerite by 1/3-1/4 of penultimate segment, penultimate segment 1.4-1.6 (avg. 1.45) times longer than terminal segment, two segments combined 1-1.25 times as long as carapace. Pereopods without epipods; pereopod I overreaching scaphocerite by almost entire carpus and with carpus 1-1.25 times as long as carapace; pereopods II subequal and with 21-38 (avg. 26) carpal

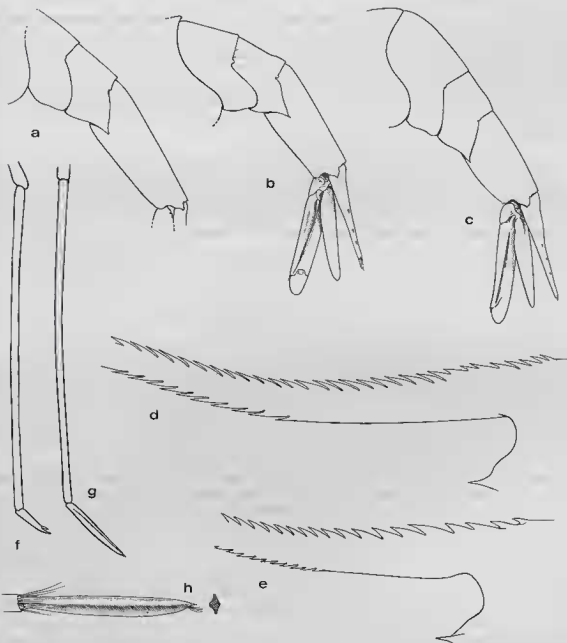


FIG. 5 a-c. — Abdominal somites IV-VI : a, *Plesionika longicauda* (Rathbun, 1901), ♀ 8 mm cl. (RMNH), Bahamas, 25°00.21'N, 77°26.1'W, 143 m; b, *Idem*, ovigerous ♀ 14.3 mm cl. (MNHN-Na 12625), Senegal, 12°32'N, 17°34'W, 95 m, 23.05.1979. — c, *Plesionika yui* sp. nov., ovigerous ♀ paratype 15 mm cl. (MNHN-Na 12623), Taiwan, Tong-Kong, about 130 m.

FIG. 5 d-e. — Posterior part of rostrum : d, *Plesionika longicauda* (Rathbun, 1901), ♂ 12.5 mm cl. (MNHN-Na 12627), Congo, off Pointe-Noire, 150-400 m. — e, *Plesionika yui* sp. nov., ovigerous ♀ paratype 15 mm cl. (MNHN-Na 12623), Taiwan, Tong-Kong, about 130 m.

FIG. 5 f-g. — Propodus and dactylus of 3rd pereopod : f, *Plesionika longicauda* (Rathbun, 1901), ♂ 14.5 mm cl. (MNHN-Na 12626), Congo, off Pointe-Noire, 160-400 m. — g, *Plesionika yui* sp. nov., ovigerous ♀ paratype 15 mm cl. (MNHN-Na 12623), Taiwan, Tong-Kong, about 130 m.

FIG. 5 h. — Dactylus of 3rd pereopod and cross section. *Plesionika yui* sp. nov., same spec. than fig. g.

articles; pereopod III overreaching scaphocerite by small portion of merus, with propodus 0.7-1.05 (avg. 0.9) times as long as carapace and 2.5-4.5 (avg. 4) times longer than dactylus; dactylus paddle-shaped and with minute accessory spine situated next to terminal spine. Length of various segments, except dactyli which become slightly shorter posteriorly, progressively longer in posterior two pereopods and with carpus of pereopod V always more than twice as long as carapace.

Abdomen with dorsal surface of somite III almost rounded. Pleura of anterior 4 somites rounded but pleuron V sharply pointed posteroventrally. Telson, usually armed with 3 pairs of dorso-lateral spinules and 3 pairs of terminal spines, 1-1.2 (avg. 1.1) times longer than abdominal somite VI. Eggs small and numerous, about 0.5 mm in diameter.

Coloration. - Body dirty red and without well-defined stripes. Rostrum with margins red. Eye dark brown. Antennal flagellum white, antennular flagellum red. Carapace sometimes very red on ventral half. Organs visible through carapace vermilion, dark blue and/or yellowish. Pereiopods red but somewhat whitish at mid segments. Tail-fan somewhat paler colored and slightly whitish. Eggs blue, becoming paler when near hatching. Ovigerous female with ventral margins of abdominal pleura covered with whitish dots.

SIZE. — Smallest ovigerous female 13 mm cl. Largest specimen 19.5 mm cl. (ovigerous female).

TYPE-LOCALITY. — Taiwan.

DISTRIBUTION. — Southern coast of Taiwan only, in about 130 meters.

REMARKS. — The epipod of maxilliped III in the present species is similar to that of *P. edwardsii* (Brandt, 1851) in being extremely minute and easily overlooked. The rudimentary state of the epipod in *P. yui* and the complete absence of it in *P. escatilis* probably represent transitions between the two *P. narval* subgroups. The much shorter and less serrated rostrum and the exceptional length and different form of dactyli in the posterior pereopods link *P. yui* more to the "*P. spinipes*" subgroup. *P. yui* is also distinct in the *P. narval* group in having the ventral rostral teeth very closely packed and the posterior pereopods very long.

It is interesting to note that the densely packed ventral rostral teeth, short rostrum, long pereopods and dactylus of *P. yui* bear some resemblance to *Pandalus stylopus* which is known only by the figure published by A. MILNE EDWARDS (1883). The type of *P. stylopus* was not found in Paris and is probably lost. Pr. J. FOREST kindly helped us to locate the position of the "*Travailleur*" station where it was collected. It is just outside the Mediterranean at 34°11'30"N - 7°39'W at a depth of 530 m. The original sketch of the species is reproduced again in fig. 16. The type seems to be a juvenile specimen of a very small size (about 6 mm cl. from the scale). Considering its locality and the materials examined in this study from similar areas, it is likely that *P. stylopus* is a juvenile specimen of *P. narval*. It is usual that the ventral rostral teeth are minute and poorly defined in very small specimens of *P. narval* group species (e.g. fig. 24 of *P. longicauda* published by RATHBUN, 1901). As DE MAN (1920) has remarked, it is even uncertain whether or not *P. stylopus* is a "*Parapandalus*" and the condition of the epipod at the maxilliped III is unknown. Nevertheless, *P. yui* still differs from *P. stylopus* in that the carpus of pereopod V is always more than twice as long as the carapace while in the figure of *P. stylopus*, the carpus of pereopod V is less than 1.6 times the carapace length. It seems likely that the exact identity of *P. stylopus* will never be sure.

The material reported by OSHIMA (1921) and MAKI and TSUCHIYA (1923) from Tong-Kong no doubt belongs to the present new species. This material was sent to the National Museum of Natural History, Washington, and identified by W. L. SCHMITT. F. A. CHACE kindly informed us that this material still exists (3 specimens in 2 lots) and is identical to the present form.

P. yui can be distinguished readily by its non-striped coloration. Like *P. narval*, it is not very common but sometimes large catches of thousands of specimens have been encountered. In Southern Taiwan, this shrimp, as

well as other *Plesionika* species, is often sold as supplementary feed for aquaculture rather than as food for the table.

ETYMOLOGY. — This Taiwanese species is named after the pioneer local carcinologist Pr H. P. YU of the National Taiwan Ocean University, for his many contributions to decapod crustacean taxonomic research in Taiwan.

Plesionika laurentae sp. nov.

Figs 6 a-e, 24

MATERIAL EXAMINED. — New Caledonia. Boulari, 300 m, trap, 22.08.1978 : 2 specs.

BIOCAL : stn CP 84, 20°43.49'S, 167°00.27'E, 150-210 m, 6.09.1985 : 1 spec.

CHALCAL 2 : stn DW 78, 23°41.3'S, 167°59.6'E, 233 m, 30.10.1986 : 1 spec.

SMIB 5 : stn DW 94, 22°19.6'S, 168°42.8'E, 275 m, 13.09.1989 : 10 specs.

Chesterfield Islands. CHALCAL 1 : stn CP 10, 20°00.2'S, 158°46.6'E, 225 m : 35 specs. — Stn CP 17, 22°34.7'S, 159°15.3'E, 295 m : 1 spec.

MUSORSTOM 5 : stn CP 311, 22°13.6'S, 159°23.9'E, 320 m, 12.10.1986 : 5 specs. (1 spec. drawn, MNHN-Na 12611; 1 spec., USNM).

CORAIL 2 : stn CP 131, 19°25.49'S, 158°37.96'E, 215-217 m, 29.08.1988 : 3 specs. (1 spec. illustrated, MNHN-Na 12609).

Eastern Australia. New South Wales (N. Sydney), December 1953 : 3 specs (RMNH).

TYPES. — *Holotype* : 1 ovigerous ♀ 12.9 mm cl. (MNHN-Na 12609), îles Chesterfield, CORAIL 2, stn CP 131. *Paratypes* : 2 ♂ 8.2 et 13.5 mm cl. (MNHN-Na 12751), îles Chesterfield, CORAIL 2, stn CP 131; 4 ♂ 10.0 à 10.8 mm cl. (MNHN-Na 12611), Nouvelle-Calédonie, MUSORSTOM 5, stn CP 311; 1 ♀ 8.8 mm cl. (MNHN-Na 12752), Nouvelle-Calédonie, BIOCAL, stn CP 84; 1 ovigerous ♀ 19.5 mm cl. (MNHN-Na 12753), Nouvelle-Calédonie, sans autre précision.

DIAGNOSIS. — Rostrum, with basal region curved downwards, somewhat convex and lacking basal notch on ventral border but with distinct low crest on dorsal border above orbit; 1.6-2.4 (avg. 2.1) times as long as carapace and recurved moderately upwards after passing antennular peduncle, armed with 46-55 (avg. 50) dorsal teeth and 28-36 (avg. 31) ventral teeth, posterior 10 ventral teeth corresponding to 15.5-18.5 (avg. 17) dorsal teeth. 4-5 post-rostral teeth present. Dorsal end of orbital margin slightly truncate. Stylocerite acute and with outer margin not curved upward. Scaphocerite 0.9-1.2 times as long as carapace. Maxilliped III with well-developed epipod, penultimate segment 1.35-1.6 (avg. 1.5) times longer than terminal segment, two segments combined 0.9-1.2 (avg. 1.1) times as long as carapace. Carpus of pereopod I 0.8-0.95 (avg. 0.9) times as long as carapace; pereopods II subequal and with 21-31 (avg. 23) carpal articles; propodus of pereopod III 0.85-1.0 (avg. 0.9) times as long as carapace and 13.5-16 (avg. 15) times longer than dactylus, accessory spine of dactylus distinct. Abdominal pleuron IV rounded but V pointed. Telson about 0.75-1.05 (avg. 0.9) times as long as abdominal somite VI.

DESCRIPTION. — Rostrum with basal region lacking ventral notch and with low but distinct crest on dorsal border above orbit, curved downwards or sometimes nearly horizontal, then upwards after passing antennular peduncle, then nearly straight, far overreaching scaphocerite, 1.6-2.4 (avg. 2.1) times as long as carapace, armed on dorsal border with 46-55 (avg. 50) closely set dorsal teeth, the teeth on the basal crest largest. Ventral border with 28-36 (avg. 31) ventral teeth, posterior teeth well spaced : posterior 10 ventral teeth corresponding to 15.5-18.5 (avg. 17) dorsal teeth. Postrostral carina very clearly marked on anterior half of carapace, with 4-5 teeth posterior to orbit. Eye spherical with distinct ocellus. Dorsal end of orbital margin slightly truncate. Antennal spine very well developed, pterygostomial spine acute, small. Stylocerite acute, with outer margin not recurved outward. Scaphocerite 0.9-1.2 times as long as carapace, with terminal spine extending slightly beyond blade.

Maxilliped III with well-developed epipod, penultimate segment 1.35-1.6 (avg. 1.5) times longer than terminal segment, two segments combined 0.9-1.2 (avg. 1.1) times as long as carapace. Pereopods without epipod. Carpus

of pereopod I 0.8-0.95 (avg. 0.9) times as long as carapace; pereopod II subequal and with 21-31 (avg. 23) carpal articles; propodus of pereopod III 0.85-1.0 (avg. 0.9) times as long as carapace, 13.5-16 (avg. 15) times longer than dactylus, accessory spine of dactylus distinct.

Abdomen with dorsal surface of somite III rounded transversely, posterior border of somite III without spine. Pleura of anterior 4 somites rounded, pleuron V terminating in sharp denticle posteroventrally. Telson 0.75-1.05 (avg. 0.9) times as long as abdominal segment VI, usually armed with 3 pairs of dorsolateral spinules and 3 pairs of terminal spines.

Coloration. - Body rather translucent with 2 subdorsal longitudinal red stripes running from rostrum to posterior border of fourth abdominal segment where they converge and disappear. Each lateral part of abdomen with 2 longitudinal red stripes, upper one running along whole abdomen, telson included, lower one fading on sixth somite. Greatest part of the sixth somite and uropods translucent white. Anteriorly, on carapace, these stripes slope down rather abruptly to the ventral border of carapace. All these stripes rather narrow and separated by wide white, translucent stripes. Rostrum only slightly colored in red on margins. Eyes pale blue or brown. Pereiopods white and red, with white dots. Eggs pale blue.

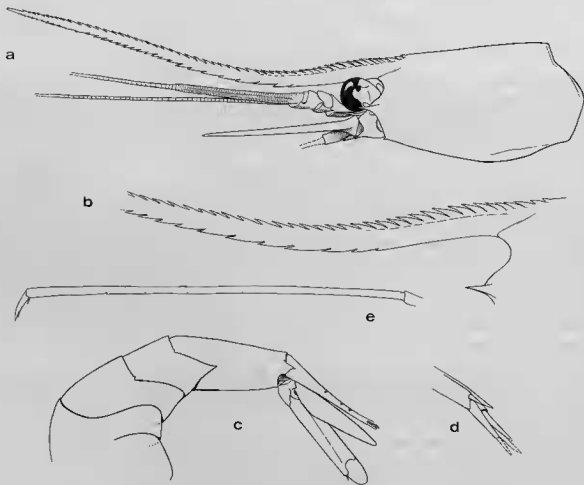


FIG. 6 a-e. — *Plesionika laurentae* sp. nov.: a-d, ovigerous ♀ holotype 12.9 mm cl. (MNHN-Na 12609), Chesterfield Islands, CORAIL 2, stn CP 131, 215 m; a, carapace and anterior appendages; b, posterior part of rostrum; c, posterior part of abdomen; d, distal part of telson. — e, ♂ paratype 11.0 mm (MNHN-Na 12611), Chesterfield Islands, MUSORSTOM 5, stn 311, 320 m: propodus and dactylus of 3rd pereopod.

SIZE. — Smallest ovigerous female 12.5 mm cl. Largest specimen 22 mm cl. (ovigerous female).

DISTRIBUTION. — South-West Pacific : New Caledonia, Chesterfield Islands and Eastern Australia in 150-210 to 320 meters.

REMARKS. — The present form is distinct in the *P. narval* subgroup by having the ventral rostral teeth spaced very far apart.

Apart from the ventral rostral teeth being very widely spaced, *P. laurentae* also differs from the other members of the *P. narval* subgroup in having a characteristic "S"-shape rostrum, with the basal section somewhat convex and the dorsal rostral teeth above the orbit forming a low but distinct crest. Furthermore, the carpus of pereopod I is relatively shorter in *P. laurentae*. Although the telson is generally slightly shorter than abdominal somite VI, there are large variations in this ratio. Moreover, *P. laurentae* can be readily distinguished from the other three short telson forms (i.e. *P. rubrior*, *P. multispinosa* and *P. pacifica*) by the characteristics discussed above. The coloration of the present form is rather similar to that of *P. narval* but it differs in that the red and white lines on the body are well separated.

ETYMOLOGY. — This species is named in honour of our colleague Michelle DE SAINT LAURENT (Muséum national d'Histoire naturelle) with regard to her extensive knowledge of Crustacea and continual readiness to help.

Plesionika rubrior sp. nov.

Figs 7 a-f, 25-28

MATERIAL EXAMINED. — French Polynesia. SMCB (J. POUPIN coll.): Society Islands : Tahiti, trap, 11.10.1978 : 2 ♂ 11 and 12.5 mm, 1 ovigerous ♀ 14.5 mm, 1 ♀ 11.5 mm (Paratypes, MNHN-Na 7247). — Maïao, 17°38.6'S, 150°39.0'W, 320 m, trap, 7.08.1989 : 5 ♂ 11.5-12.5 mm (Holotype, MNHN-Na 12620; 4 paratypes USNM).

Tuamotu Islands : Takapoto, 14°40.0'S, 145°15.2'W, 250 m, trap, 7.06.1989 : 7 ♂ 11-13 mm (Paratypes, MNHN-Na 12599). — Mururoa, 350-600 m, trap, no date : 1 ♀ 11.5 mm (Paratypes, MNHN-Na 12598); 21°48.1'S, 138°55.9'W, 220 m, trap, 2.12.1989 : 6 specs (Paratypes, MNHN-Na 12600); 21°51.2'S, 139°00'W, 130 m, 17.05.1990 : 8 specs (MNHN-Na 12700). — Nihuru : 16°42.8'S, 142°52.8'W, 220 m, trap, 15.11.1989 : 19 specs (Paratypes, MNHN-Na 12596). — Tenuarunga : 21°21.0'S, 136°32.0'W, 160 m, trap, 19.11.1989 : 51 specs (Paratypes, MNHN-Na 12597).

Tubuai Islands : Rurutu, 22°27.8'S, 151°22.9'W, 240-260 m, trap, 10 March 1989 : 5 ♂ 11-12 mm (Paratypes, MNHN-Na 12602). — Rimatarā, 22°38.2'S, 152°49.7'W, 230-290 m, trap, 11.03.1989 : 1 ♂ 12 mm (Paratypes, MNHN-Na 12601).

TYPES. — Holotype : 1 ♂ 12 mm cl., Maïao, French Polynesia, 17°38.6'S, 150°39.0'W, 320 m, 7.08.1989. The other specimens are paratypes. Four paratypes are deposited in USNM.

DIAGNOSIS. — Rostrum 2.5-2.85 times longer than carapace, with basal region somewhat upturned and having ventral notch, directed dorsad and nearly straight, armed with 71-85 dorsal teeth and 53-66 ventral teeth, posterior 10 ventral teeth corresponding to 9-13 dorsal teeth. Carapace with 2-4 post-rostral teeth. Dorsal end of orbital margin slightly truncate. Stylocerite broadly acute and with outer margin strongly curved upward. Scaphocerite slightly longer than carapace. Maxilliped III with well-developed epipod, penultimate segment 1.35-1.7 times longer than terminal segment, two segments combined 1.2-1.35 times as long as carapace. Pereiopod I with carpus 1.15-1.25 times as long as carapace; pereopods II subequal and with 27-31 carpal articles; pereopod III with propodus 1.3-1.45 times as long as carapace and 14.5-16 times longer than dactylus, accessory spine of dactylus distinct. Abdominal pleuron IV rounded but V pointed. Telson 0.75-0.9 times shorter than abdominal somite VI.

DESCRIPTION. — Rostrum nearly straight and directed slightly dorsad, with basal region upturned and with posterior notch at ventral border, 2.5-2.85 (avg. 2.65) times longer than carapace, with 71-85 (avg. 77) closely set dorsal teeth and 53-66 (avg. 61) ventral teeth, posterior 10 ventral teeth corresponding to 9-13 (avg. 11.5) dorsal teeth. Post-rostral carina with 2-4 teeth on carapace. Eyes spherical with distinct ocellus. Orbital margin generally

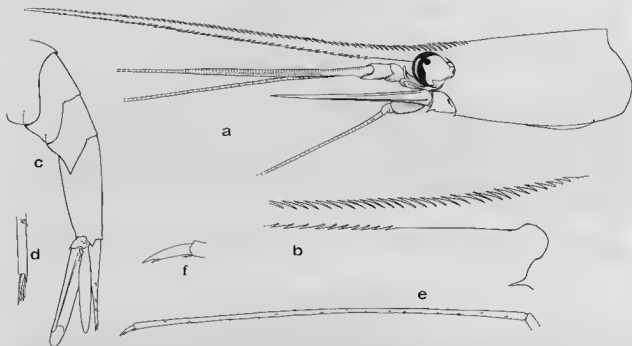


FIG. 7. — *Plesionika rubrior* sp. nov., ♂ holotype 11.5 mm cl. (MNHN-Na 12620), French Polynesia, Maïao, 320 m : a, carapace and anterior appendages; b, posterior part of rostrum; c, posterior part of abdomen; d, distal part of telson; e, propodus and dactylus of 3rd pereopod; f, dactylus of 3rd pereopod.

concave with dorsal end slightly truncate. Antennal, pterygostomial and bascerite spines well-developed. Stylocerite broadly acute and with outer margin strongly curved upward. Scaphocerite 1.05-1.15 (avg. 1.1) times as long as carapace.

Maxilliped III with well-developed epipod, penultimate segment 1.35-1.7 (avg. 1.5) times longer than terminal segment, two segments combined 1.2-1.35 (avg. 1.3) times as long as carapace. Pereiopods without epipods, carpus of pereopod I 1.15-1.25 (avg. 1.2) times as long as carapace; pereopods II subequal and with 27-31 (avg. 29) carpal articles; pereopods III with propodus 1.3-1.45 (avg. 1.35) times as long as carapace and 14.5-16 (avg. 15.5) times longer than dactylus, accessory spine distinct and situated posterior to terminal spine; propodus of pereopod V 1.8-2.15 (avg. 2.05) times longer than carapace.

Abdomen with dorsal surface of somite III slightly arched transversely but not angular. Pleura of anterior 4 somites rounded but pleuron V terminated into sharp denticle postero-ventrally. Telson usually armed with 3 pairs of dorsolateral spinules and 3 pairs of terminal spines, 0.75-0.9 (avg. 0.85) times shorter than abdominal somite VI in both adults and juveniles. Eggs small and numerous, about 0.5 mm in diameter.

Coloration. - Body whitish and covered dorsally with two longitudinal red stripes, disappearing posterior to third abdominal somite. Usually 2 wide longitudinal red stripes on each side of body, upper one running from orbit to posterior end of sixth abdominal somite, lower one starting between the antennal and pterygostomial spines and fading on the fourth, fifth or sixth abdominal somite. Width of these stripes varying considerably between specimens : some having wide red stripes and so appearing mainly red-colored, some having whitish patches within the red stripes. A few even have the whitish patches connected and almost separating the upper longitudinal red stripe into two stripes and the stripes on the carapace lacking. Some specimens show a large yellow patch on the carapace and the first abdominal segment together with a very reduced pattern of red stripes. Telson and uropods whitish. Rostrum red with upper margin white, especially in its posterior part. Eyes dark brown. Antennae red; antennules white. Pereiopods red with whitish parts.

SIZE. — An ovigerous female (14.5 mm cl.) is the largest specimen examined.

TYPE-LOCALITY. — French Polynesia (Maiao).

DISTRIBUTION. — French Polynesia only, from 120 to at least 350 meters.

REMARKS. — The present species closely resembles *P. flavicauda* and *P. serratifrons*. Nevertheless, *P. rubrior* is distinct in the telson being proportionally shorter. The ovigerous female (14.5 mm cl.) has the telson 0.9 times as long as abdominal somite VI; for specimens of similar size in the other two species, the telson is almost as long as or even slightly longer than abdominal somite VI. For specimens of 11-13 mm cl. in the other two species, the telson is 0.9 times or more as long as abdominal somite VI; it is usually shorter than 0.9 in *P. rubrior*. Furthermore, *P. rubrior* generally differs from *P. serratifrons* in having more teeth on the rostrum (on average about 10 teeth more on both the dorsal and ventral borders).

The proportionally shorter telson relates the present species to *P. pacifica* from Hawaii. Nevertheless, *P. rubrior* can be readily distinguished from *P. pacifica* by having a much higher number of rostral teeth and the penultimate segment of maxilliped III being proportionally longer. Furthermore, there is always a ventral notch at the base of the rostrum in *P. rubrior* but this notch is absent in *P. pacifica*.

The coloration of *P. rubrior* is distinct from the other striped species of the *P. narval* group in the red color on the body being more prevalent than the white (or transparent). However there are strong variations in the coloration of the specimens as mentioned above.

ETYMOLOGY. — The name is derived from the comparative of the Latin adjective *ruber* and reflects the usually redder color of this species compared to the other striped members of the *P. narval* subgroup.

Plesionika multispinosa (Zarenkov, 1971)

Fig. 8 a-d

Parapandalus multispinosus Zarenkov, 1971 : 185, pl. 2, figs 11-20 (type locality : Easter Island). — BURUKOVSKY, 1982 : 41 (in key).

Plesionika multispinosus - CHACE, 1985 : 46 (in key).

MATERIAL EXAMINED. — Off Easter Island. R.V. "Ob", stn 432, 80-150 m, volcanogenic sand, Sigsbee trawl, 9.05.1958 : 1 ♀ paratype 11.2 mm (MNHN-Na 12750).

DIAGNOSIS. — Based on paratype examined. Rostrum, with basal region nearly horizontal, lacking basal notch on ventral border, without crest on dorsal border above orbit; 2.15 times as long as carapace, recurved slightly upwards after passing antennular peduncle, armed with at least 59 dorsal teeth and 39 ventral teeth, broken at tip, posterior 10 ventral teeth corresponding to 7 dorsal teeth. Carapace with 4 post-rostral teeth. Upper end of orbital margin slightly truncate. Stylocerite with outer margin clearly curved upward distally. Scaphocerite 1.07 times as long as carapace. Maxilliped III with well-developed epipod, penultimate segment 1.2 times longer than terminal segment, two segments combined about as long as carapace. Carpus of pereopod I missing; pereopods II subequal, with 31 carpal articles; propodus of pereopod III missing. Abdominal pleuron IV rounded, V with a small spine slightly recurved upward. Telson about 0.8 times as long as abdominal somite VI.

Coloration. - Unknown.

SIZE. — Largest specimen 16.7 mm cl. (female).

DISTRIBUTION. — South Pacific : Easter Island, in 80-150 meters.

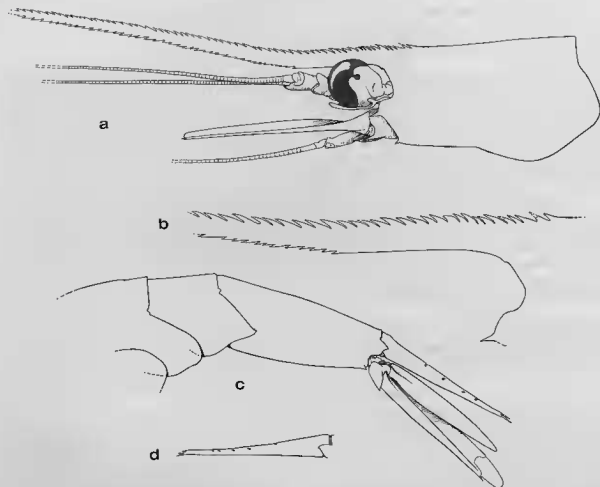


FIG. 8 a-d. — *Plesionika multispinosa* (Zarenkov, 1971), ♀ paratype 11.2 mm cl. (MNHN-Na 12750), off Easter Island, 80-150 m : a, carapace and anterior appendages; b, posterior part of rostrum; c, posterior part of abdomen; d, right side of telson.

REMARKS. — ZARENKOV (1971), who examined four specimens, gives the following variations for the numbers of rostral teeth : 4-5 + 55-63/38-47 + 1.

The telson of the specimen we examined bears four dorsolateral spinules on the left side and 5 on the right side and 3 pairs of terminal spines. Since the number of dorsolateral spinules on the telson may sometimes deviate from the typical 3 pairs in the species of the "*P. narval*" group, more specimens are needed to determine whether the number of spinules is always higher in the present species.

Using the key provided, this species keys out with *P. pacifica*. It can be easily separated by the number of dorsal rostral teeth corresponding to the 10 posterior ventral ones (about 7 for the former and 12 for the latter).

Plesionika pacifica Edmondson, 1952

Fig. 9 a-f

Plesionika pacificus Edmondson, 1952 : 67, fig. 1 (type locality : Hawaii).

Plesionika pacifica - CHACE, 1985 : 47 (in key).

MATERIAL EXAMINED. — Hawaii, off Kona Coast, from stomach of "opakapaka", 183 m, 19.08.1951: 1 ♀ 11 mm, holotype (BM-S 5772). — Off Makapuu, Oahu, 21°18.7'N, 157°33.4'W, gorgonian beds, 365 m, HURL Dive 83-147, 22.02.1983, D. DEVANEY coll., R. MOFFITT id.: 1 ♀ 8.6 mm (BM-S 10885).

DIAGNOSIS. — Rostrum long, with basal region horizontal and straight, without ventral notch, curved slightly upwards and armed with about 50 dorsal teeth (including 4 on postrostral ridge of carapace) and 30 ventral teeth.

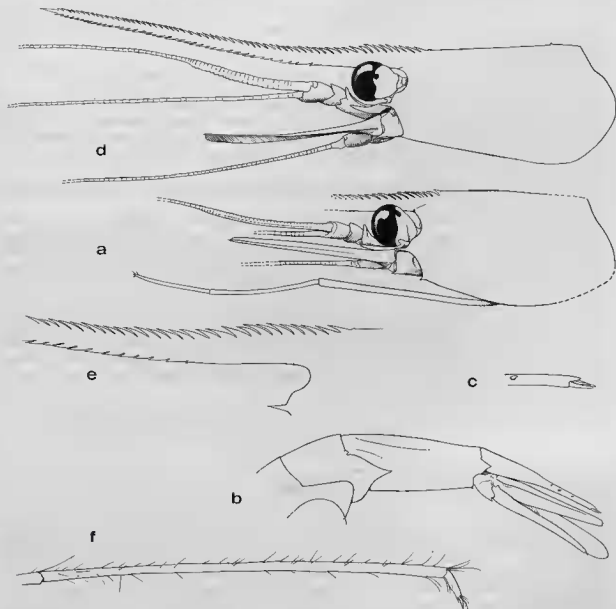


FIG. 9 a-c. — *Plesionika pacifica* Edmondson, 1952, ♀ holotype 11 mm cl. (BM-S 5772), Hawaii, Big Island, off the Kona coast, 183 m, 19.08.1951: a, carapace and anterior appendages; b, posterior part of abdomen; c, distal part of telson.

FIG. 9 d-f. — *Plesionika ? pacifica* Edmondson, 1952, ♀ 8.6 mm cl. (BM-S 10885), Hawaii, off Makapuu, Oahu, 21°18.7'N, 157°33.4'W, gorgonian beds, 365 m, HURL Dive 83-147, 22.02.1983, D. DEVANEY coll., R. MOFFITT id.: d, carapace and anterior appendages; e, posterior part of rostrum; f, propodus and dactylus of 3rd pereopod.

Posterior 10 ventral teeth corresponding to about 12 dorsal teeth. Dorsal end of orbital margin slightly truncate. Stylocerite sharply acute and with outer margin slightly curved upward. Scaphocerite as long as carapace. Maxilliped III with well-developed epipod, penultimate segment 1.4 times or less as long as terminal segment, two segments combined 1.1 times as long as carapace. Pereiopod 1 with carpus 0.95 times as long as carapace; pereopods II subequal and with about 23 carpal articles. Abdominal pleuron IV rounded but V pointed. Telson 0.8-0.9 times shorter than abdominal somite VI.

Coloration. - Stated by EDMONDSON (1952) as pink.

SIZE. - Smallest ovigerous female 8.4 mm (CHACE, 1985). The holotype, a female of 11 mm cl., is the largest specimen recorded.

DISTRIBUTION. - Only known from the Hawaii, in 180-195 m (perhaps 365 m, see below).

REMARKS. - The female type of *P. pacifica* has the rostrum broken off almost at base (fig. 9 a) and all the pereopods missing. There are some dissected body parts in the jar, probably used by EDMONDSON for the drawings he published. Nevertheless the body parts are from at least two specimens as several parts are doubled. The diagnosis above has been established from the holotype, the description given by EDMONDSON (1952) and the key proposed by CHACE (1985).

As expected, *P. pacifica* has an epipod on the maxilliped III but lacks epipods on the pereopods while the abdominal pleuron IV is rounded.

Due to the kindness of B. BURCH we were able to examine another specimen from Hawaii, collected at 365 m deep, which in spite of a very long spine on the basicerite (this spine is short on the holotype) probably belongs to *P. pacifica* (fig. 9 d-f). The rostrum of this specimen is unbroken and bears 59 dorsal teeth and 41 ventral teeth, the posterior 10 ventral teeth corresponding to 13 dorsal teeth. The propodus of pereopod II is about 10 times longer than the dactylus (fig. 9 f). The telson bears 3 pairs of dorsolateral spinules and 3 pairs of terminal spines.

The morphological characters of *P. pacifica* closely resemble those of *P. narval* but the telson is shorter than abdominal somite VI (fig. 9 b). The penultimate segment of maxilliped III in *P. pacifica* is also proportionally shorter than the terminal segment being 1.4 times as long as the latter in the type and only 1.35 times in the other specimen. Thus, it seems justified to follow CHACE in treating *P. pacifica* as a distinct species, however more topotypic material will be needed for a better understanding of this poorly known species and its relationships with the other species, particularly *P. narval*.

Plesionika flavicauda sp. nov.

Figs 10 a, 11 a-c, 29-32

Parapandalus serratifrons 2 - KING, 1984 : 181 (non Borradaile, 1900)

Plesionika sp. nov. 1 - POUPIN *et al.*, 1990, pl. III-e.

MATERIAL EXAMINED. - New Caledonia. Trawl : 1 ♂ 16.5 mm, 1 ovigerous ♀ 19.5 mm (Paratypes, MNHN-Na 12592). - Boulari, 100 m, trap, 13.10.1978 : 4 ♂ 16-16.5 mm, 3 ovigerous ♀ 17-19 mm (Paratypes, MNHN-Na 12590).

French Polynesia. SMCB (J. POUPIN coll.). *Society Islands : Tahiti*, trap, 8.10.1978 : 1 ♂ 11.5 mm, 1 ovigerous ♀ 20.0 mm (Paratypes, MNHN-Na 12591). - *Tahiti* (Port Phaeton), October 78 : 1 ovigerous ♀ 17.5 mm (Paratype, USNM).

Tuamotu Islands : Takapoto, 14°40.0'S, 145°15.2'W, 250 m, 7.06.1989 : 20 ♂ 10-15.5 mm (Paratypes, MNHN-Na 12593). - *Fangataufa*, 22°16.3'S, 138°43.3'W, 200 m, trap, 4.12.1989 : 1 ♀ 10.5 mm (Paratype, MNHN-Na 12594). - *Mururoa*, 21°51.2'S, 139°00'W, 130 m, 17.05.1990 : 8 specs (MNHN-Na 12719).

Tubuai Islands : Rurutu, 22°27.8'S, 151°22.9'W, 240-260 m, trap, 10.03.1989 : 1 ♂ 16.5 mm (Holotype, MNHN-Na 12615).

TYPES. - *Holotype* : 1 ♂ 16.5 mm cl. (MNHN-Na 12615), Rurutu, French Polynesia, 22°27.8'S, 151°22.9'W, 240-260 m, 10.03.1989. The other specimens are paratypes.

DIAGNOSIS. — Rostrum with slight curvature and directed dorsad, 2.1-3.0 times longer than carapace and armed with 67-80 dorsal teeth and 58-70 ventral teeth, posterior 10 ventral teeth corresponding to 7-10.5 dorsal teeth. 2-4 post-rostral teeth present on carapace. Orbital margin with dorsal end slightly truncate. Stylocerite broadly acute and with outer margin strongly curved upward. Scaphocerite slightly longer than carapace. Maxilliped III with well-developed epipod, penultimate segment 1.45-1.6 times longer than terminal segment, two segments combined 1.05-1.3 times as long as carapace. Carpus of pereopod I 0.9-1.15 times as long as carapace; pereopods II subequal and with 25-30 carpal articles; propodus of pereopod III 1.1-1.3 times as long as carapace and 13-20 times longer than dactylus, accessory spine of dactylus distinct. Abdominal pleuron IV rounded but V pointed. Telson as long as or slightly longer than abdominal somite VI in adults.

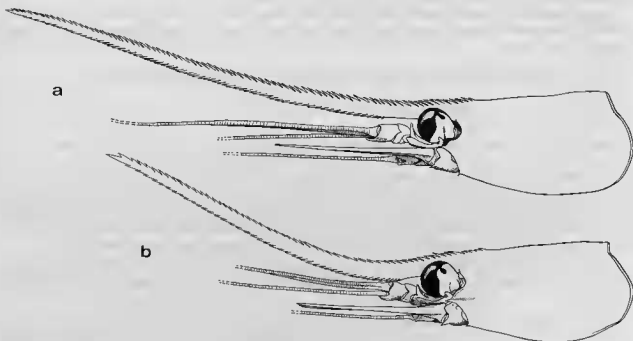


FIG. 10. — Carapace and anterior appendages: a, *Plesionika flavicauda* sp. nov., ♂ holotype 16.5 mm cl. (MNHN-Na 12615), French Polynesia, Rurutu, 240-260 m; b, *Plesionika curvata* sp. nov., ovigerous ♀ holotype 18.5 mm cl. (MNHN-Na 12616), French Polynesia, Tubuai, 200 m.

DESCRIPTION. — Rostrum, lacking lateral carina, horizontal or slightly upturned at basal region and with or without ventral notch, slightly curved upwards and 2.1-3.0 (avg. 2.45) times longer than carapace, armed on almost entire dorsal border with 67-80 (avg. 74) closely set teeth and ventral border with 58-70 (avg. 65) teeth, posterior 10 ventral teeth corresponding to 7-10.5 (avg. 9) dorsal teeth. 2-4 post-rostral teeth present on carapace posterior to orbital margin. Eyes spherical with distinct ocellus. Orbital margin generally concave and with dorsal end slightly truncate. Antennae, pterygostomian and basicerite spines well-developed. Stylocerite broadly acute and with outer margin strongly curved upward. Scaphocerite 1-1.1 (avg. 1.05) times as long as carapace.

Maxilliped III with well-developed epipod, penultimate segment 1.45-1.6 (avg. 1.55) times longer than terminal segment, two segments combined from 1.05 to 1.3 (avg. 1.2) times as long as carapace. Pereiopods without epipods; carpus of pereopod I 0.9-1.15 (avg. 1.05) times as long as carapace; pereopods II subequal and with 25-30 (avg. 28) carpal articles; pereopod III with propodus about 1.2 (1.1-1.3) times as long as carapace and 13-20 (avg. 16) times longer than dactylus, accessory spine of dactylus distinct and situated posterior to terminal spine; propodus of pereopod V 1.8-2 (avg. 1.85) times as long as carapace.

Abdomen with dorsal surface of somite III slightly arched transversely but not angular. Pleura of anterior 4 somites rounded but pleuron V terminating in sharp denticle posteroventrally. Telson usually armed with 3 pairs

of dorsolateral spinules and 3 pairs of terminal spines, nearly as long as or slightly longer than abdominal somite VI in adults. Eggs small and numerous, about 0.5 mm in diameter.

Coloration. - Carapace and dorsal part of one or more anterior abdominal somites pinkish to somewhat purple-pink. Rest of abdomen, telson and uropods, bright yellow, the extension of the yellow color being rather variable (from slightly more than tail-fan to almost entire abdomen). On subdorsal and ventrolateral parts of carapace two very sharp and narrow white stripes (subdorsal one often yellowish, ventrolateral one starting from basicerite spine) with red margins. Subdorsal stripe fading posteriorly on first abdominal somite or extending farther onto third somite, ventrolateral one remaining very distinct on five anterior abdominal somites. Rostrum red with dorsal and ventral margins more or less white. Eyes dark brown. Antennular flagellum whitish and antennal flagellum red. Pereiopods and pleopods mainly red with some white parts.

Notable variation from above pattern occurs in specimens from single collections. Extreme examples show loss of yellow from abdomen, with mottling of lateral aspects of body. All intermediate stages occur between extremes of color pattern.

SIZE. — Smallest ovigerous female 17 mm cl. Largest specimen is an ovigerous female of 20 mm cl.

TYPE-LOCALITY. — French Polynesia, Rurutu.

DISTRIBUTION. — South Pacific : French Polynesia, Tonga, Fiji and New Caledonia, 100 to 380 meters.

REMARKS. — The present species is distinct from all congeners except *P. rubrior* in having a much higher number of rostral, especially ventral rostral, teeth. Only very little overlapping at the boundaries of the ranges of ventral rostral tooth counts occurs for *P. flavicauda* with *P. serratifrons* and *P. narval* (mostly from La Réunion). *P. flavicauda* can be further distinguished from *P. serratifrons* by the posterior rostral teeth being more closely set at the ventral border, and differs from *P. narval* of La Réunion in always having more dorsal rostral teeth.

P. flavicauda shows some similarities to *P. rubrior* but differs in having a relatively longer telson. The length of the distal two segments of the maxilliped III and the carpus of pereopod I are also generally slightly shorter in *P. flavicauda*.

The coloration of *P. flavicauda* is unique in the *P. narval* group for those species which have had their coloration described. It can be recognized easily by the two widely spaced stripes on the body and the yellowish tail.

KING (1984) had doubts on his *P. serratifrons* material from the South-West Pacific and suspected that two distinct species were represented. It is likely that his "*P. serratifrons* 2" from Fiji and Tonga, described as consisting of a mosaic pattern of red and yellow, belongs to *P. flavicauda*.

ETYMOLOGY. — From the Latin *flavus* (yellow) and *cauda* (tail).

Plesionika curvata sp. nov.

Figs 10 b, 11 d-f, 33

Plesionika sp. nov. 2 - POUPIN *et al.*, 1990, pL III-f.

MATERIAL EXAMINED. — French Polynesia. SMCB (J. POUPIN coll.) : Tuamotu Islands : *Gambier*, 150 m, trap : 1 ♀ 12.5 mm. — *Fangataufa*, 22°16.3'S, 138°43.3'W, 200 m, trap, 4.12.1989 : 1 ♀ 13.3 mm (Paratype, MNHN-Na 12588).

Tuvalu Islands : *Tubuai*, 23°40'S, 149°40'W, 200 m, trap, 14.05.1979 : 1 ♀ 14.5 mm, 11 ovigerous ♀ 18-21 mm (Holotype, MNHN-Na 12616; paratypes, MNHN-Na 12587). — *Rapa*, 27°65'S, 144°35'W, 200-400 m, trap, 26.08.1988 : 2 ♀ 15 and 19 mm (paratypes, one illustrated, MNHN-Na 12608; other one, MNHN-Na 12589). — *Rimatara*, 22°38.2'S, 152°49.7'W, 230-290 m, trap, 11.03.1989 : 4 juveniles 11.5-12 mm, 1 ♀ 14 mm.

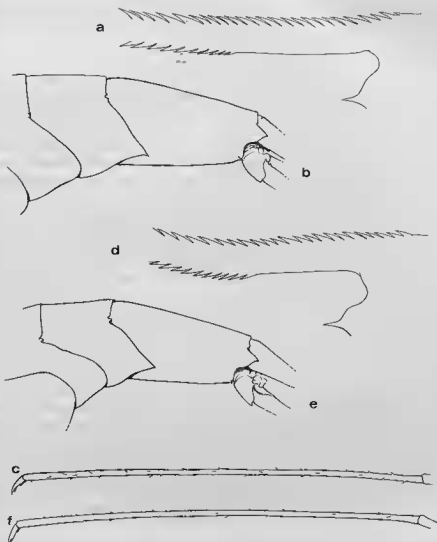


FIG. 11 a-c. — *Plesionika flavicauda* sp. nov., ♂ holotype 16.5 mm lc. (MNHN-Na 12615), French Polynesia, Rurutu, 240-260 m : a, posterior part of rostrum; b, abdominal somites IV-VI; c, propodus and dactylus of 3rd pereiopod.

FIG. 11 d-f. — *Plesionika curvata* sp. nov. : d-e, ovigerous ♀ holotype 18.5 mm cl. (MNHN-Na 12616), French Polynesia, Tubuai, 200 m : d, posterior part of rostrum; e, abdominal somites IV-VI. — ♀ 15.0 mm cl. (MNHN-Na 12608), French Polynesia, Rapa, 200-300 m : f, propodus and dactylus of 3rd pereiopod.

TYPES. — *Holotype* : 1 ovigerous ♀ 18.5 mm cl. (MNHN-Na 12616), Tubuai, French Polynesia, 200 m, 14.05.1979.

Paratypes : The other specimens collected at Fangataufa, Tubuai and Rapa are paratypes. Two paratypes from Tubuai are deposited at the USNM.

DIAGNOSIS. — Rostrum, with basal region curved downwards or nearly horizontal, strongly and abruptly curved upwards after passing antennular peduncle, 2.3-2.7 times longer than carapace and armed with 51-67 dorsal teeth and 40-47 ventral teeth, posterior 10 ventral teeth corresponding to 7-9 dorsal teeth. Carapace with 3-4 post-rostral teeth. Dorsal end of orbital margin slightly truncate. Stylocerite tapered anteriorly and with outer margin slightly curved upward. Scaphocerite more or less as long as carapace. Maxilliped III with well-developed epipod, penultimate segment 1.25-1.4 times longer than terminal segment, two segments combined 1.2-1.3 as long as

carapace. Pereiopod I with carpus 1.05-1.15 times as long as carapace; pereopods II subequal with 29-38 carpal articles; propodus of pereiopod III 1.1-1.25 times as long as carapace and 15.5-21.5 times longer than dactylus, dactylus with distinct accessory spine. Abdominal pleuron IV rounded but V pointed. Telson nearly as long as or slightly longer than abdominal somite VI in adults.

DESCRIPTION. — Rostrum with basal region lacking ventral notch and curved downwards or nearly horizontal, abruptly and strongly curved upwards after passing antennular peduncle and sometimes bending slightly downwards again near apex, far overreaching scaphocerite and 2.3-2.7 (avg. 2.5) times as long as carapace, armed on dorsal border with 51-67 (avg. 55) closely set teeth, ventral border with 40-47 (avg. 44) teeth, posterior 10 ventral teeth corresponding to 7-9 (avg. 8) dorsal teeth. Post-rostral carina with 3-4 teeth on carapace. Eye spherical with distinct ocellus. Orbital margin generally concave with dorsal end slightly truncate. Antennal, pterygostomial and basicerite spines well-developed. Stylocerite tapered anteriorly and with outer margin only slightly curved upward. Scaphocerite 1-1.05 times as long as carapace.

Maxilliped III with well-developed epipod, penultimate segment 1.25-1.4 (avg. 1.3) times longer than terminal segment, two segments combined 1.2-1.3 times as long as carapace. Pereiopods without epipods; carpus of pereiopod I 1.05-1.15 (avg. 1.1) times as long as carapace; pereiopods II subequal and with 29-38 (avg. 32) carpal articles; propodus of pereiopod III 1.1-1.25 (avg. 1.15) times as long as carapace and 15.5-21.5 (avg. 18) times longer than dactylus, dactylus with accessory spine distinct and situated posterior to terminal spine; propodus of pereiopod V 1.5-1.95 (avg. 1.75) times as long as carapace.

Abdomen with dorsal surface of somite III slightly arched transversely but not sharply angular. Pleura of anterior 4 somites rounded but pleuron V terminating in sharp denticle posteroventrally. Telson, usually armed with 3 pairs of dorsolateral spinules and 3 pairs of terminal spines, nearly as long as or slightly longer than abdominal somite VI in adults. Eggs small and numerous, about 0.5 mm in diameter.

Coloration. — The general pattern seems similar to what is observed in *P. laurentae* (cf. fig. 24), but in this species the red stripes are much wider and better defined. The width of the red stripes on the lateral parts of the abdomen varies and in some specimens can be one and half times as wide as in others. The lower lateral red stripe extends along the whole length of the abdominal somites and most of the uropodal exopod of which only the tip is white. The internal margin of the uropodal endopod is red, elsewhere the endopod is white. On the carapace, the lateral red stripes curve and meet the lower border of the carapace; in the upper part, under the subsorsal stripe, a large red band connected or not with the upper abdominal red stripe runs to the orbit. The rostrum (except the basal dorsal teeth which are white) and antennae are entirely red; the antennules are white. The pereiopods are red with some white patches.

SIZE. — Smallest ovigerous female 18 mm cl. Largest specimen (ovigerous female) 21 mm cl. Specimen of 12 mm cl. with rudimentary exopod on maxilliped III.

TYPE-LOCALITY. — French Polynesia, Tubuai.

DISTRIBUTION. — French Polynesia only; 150 to about 300 meters.

REMARKS. — *P. curvata* is distinct in having a strongly and abruptly curved rostrum very similar to that of *P. edwardsii* (Brandt, 1851). The meristic characters of *P. curvata* are somewhat similar to *P. narval* but the rostrum of the latter is rarely strongly curved. The curvature of the rostrum is remarkably abrupt in *P. curvata* but always smooth in *P. narval*. Furthermore, the penultimate segment of maxilliped III in *P. curvata* is proportionally shorter and the ventral rostral teeth are always more closely spaced than the dorsal ones. The number of carpal articles in pereiopod II is also generally higher in *P. curvata*. The coloration of *P. curvata* is also quite distinct from *P. narval* in the lateral stripes on the carapace obliquely curving downwards and the tips of the tail-fan being whitish.

The maximum size of *P. curvata* appears to be quite large, as rudimentary exopods can still be found in specimens of 12 mm cl.

ETYMOLOGY. — The species is named from the Latin *curvatus* (bent), referring to the shape of the rostrum.

Plesionika narval (Fabricius, 1787)

Figs 12 a-c, 13 a, 14 a-c, 15 a-e, 34-36

- Astacus Narval* Fabricius, 1787 : 331 (type-locality : probably Nice, Mediterranean).
Palemón Pristis Risso, 1816 : 105.
Pontophilus pristis - RISSO, 1827 : 63, pl. 4, fig. 14.
Pandalus pristis - DE HAAN, 1849 : 175.
Pandalus escaatilis Stimpson, 1860 : 37.
Parapandalus pristis - BALSS, 1914 b : 134; 1915 : 19. — DE MAN, 1920 : 150, pl. 13, fig. 35, 35 a.
Parapandalus escaatilis - DE MAN, 1920 : 140 (in key). — BURUKOVSKY, 1982 : 41 (in key).
Parapandalus serratifrons - DE MAN 1920 : 146, pl. 12, fig. 34 a, c, pl. 13, fig. 34, 34 b, d, e (non Borradaile, 1900).
Pandalus pristis var. *escaatilis* - BALSS, 1925 : 283, figs 60-65.
Pandalus (Parapandalus) pristis - DIEUZEIDE, 1930 : 568; 1931 : 6, fig. 4 lower photo, plate page 10.
Parapandalus spinipes grandis - YOKOYA, 1933 : 20, ? *pro parte*, (non Doflein, 1902).
Parapandalus spinipes - CALMAN, 1939 : 201, *pro parte*, specs stn 208 only. — MASUDA & HATA, 1969 : 90, 3 unnumbered photos in color. — KUBO, 1971 : 611, fig. 958. — SUZUKI, 1974 : 27, fig. 1 a. — MIYAKE, 1975 : 100, photo in color; 1982 : 61, pl. 21-1 in color. — MATSUZAWA, 1977, pl. 69, fig. 4 in color. — TAKEDA, 1982 : 20, fig. 59, cover color photo (non Bate, 1888).
Parapandalus narval - HOLTHUIS, 1947 : 316; 1949 : 230, fig. 1; 1980 : 142, *pro parte*; 1987 : 250, 1 unnumbered fig. — LAGARDÈRE, 1971 : 101, fig. 236; 1981 : PANDL Parapand 1, 1 unnumbered fig., *pro parte*. — CROSNIER, 1976 : 235, fig. 4 b. — GEORGE & GEORGE, 1980 : 83, fig. 4. — BURUKOVSKY, 1982 : 42, *pro parte* (in key).
Plesionika serratifrons - CHACE, 1985 : 121, figs 55-56. — HAYASHI, 1986 : 139, fig. 89 in color (non Borradaile, 1900).
Plesionika spinipes - TAKEDA, 1986 : 107, photo in color (non Bate, 1888).
Plesionika narval - LEMAITRE & GORE, 1988 : 385, figs 3 K-M, 4.
? *Pandalus stylopus* A. Milne Edwards, 1883, pl. 19, fig. unnumbered.
? *Parapandalus stylopus* - DE MAN, 1920 : 140 (in key). — BURUKOVSKY, 1982 : 42 (in key).
Not *Pandalus narval* - H. MILNE EDWARDS, 1841, pl. 54, fig. 2 [= *P. edwardsii* (Brandt) (Brandt)].
Not *Parapandalus Narval* - DE MAN, 1920 : 140 (in key) [= *P. edwardsii* (Brandt, 1851)].
Not *Pandalus (Parapandalus) narval* - DIEUZEIDE, 1930 : 567; 1931 : 3, figs 1- 3, 4 upper photo, plate page 7 [= *P. edwardsii* (Brandt, 1851)].
Not *Parapandalus narval* - HOLTHUIS, 1951 : 68. — CROSNIER & FOREST, 1973 : 221, fig. 69 a [= *P. longicauda* (Rathbun, 1901)].
Not *Parapandalus narval* - LEDOYER, 1979 : 144 [= *P. edwardsii* (Brandt, 1851)].
Not *Plesionika escaatilis* - LEMAITRE & GORE, 1988 : 383, figs 1, 2, 3 A-J, 4 [= *P. longicauda* (Rathbun, 1901)].

MATERIAL EXAMINED. — Mediterranean. France (Nice) : 1900. 3 specs. — Italy (Naples) : 1 spec., identified by H. MILNE-EDWARDS with 2 *P. edwardsii* as *P. narval*. — May 1959 : 1 spec. (RMNH). — Greece : Rhodes, trap, January 1985 : 5 specs. — Algeria : 120 m, 16.03.1929 : 3 specs.

Eastern Atlantic. Gibraltar : Cruises Prince de Monaco, stn CP 25, 36°41'N, 07°19'W, 543-544 m, 31.05.1984 : 1 spec. — Stn CP 78, 33°49'N, 08°22'W, 246-250 m, 6.06.1984 : 1 spec. — Madeira : 2 dry syntypes of *Pandalus escaatilis*, sex undeterminable, 9.5 and 11 mm cl. (BMNH 61-44). — Funchal, 22.02.1867 : 2 specs. — Funchal, fish market, 29.09.1956 : 8 specs (RMNH). — Cape Verde Islands : "Talisman", stn 110, 16°53'N, 25°10'W, 410-460 m, 29.07.1883 : 4 specs.

Indian Ocean. Madagascar : "Vauban", no other data : 4 specs. — La Réunion : 250 m, trap, 12.11.1972 : 2 specs. — 150 m, trap, 12.11.1972 : 15 specs. — 180 m, trap, November 1972 : 3 specs. — No date : 2 specs. — Seychelles : CEPROS : stn 3.17, 04°35.2'S, 56°24.9'E, 230 m, 22.10.1987 : 1 spec. — Stn 5.28, 05°48.2'S, 56°45.0'E, 200-220 m, 24.10.1987 : 1 spec.

Red Sea. JOHN MURRAY EXP., stn 208, 15°48'30"N, 41°30'30"E, 732-800 m, 17.05.1934 : 2 specs (BMNH 1939.10.9.200).

West Pacific. Japan : 1 ♀ 18 mm cl., identified by DE HAAN as *Pandalus pristis* in Fauna Japonica, 1849 (RMNH). — Sagami Bay, 80 m, 28.04.1973 : 2 specs (RMNH). — Taiwan : Commercial trawler, Tai-Chi, I-Lan County, 22.09.1984 : 1 spec. (NTOU). — *Ibidem*, 29.11.1984 : 1 spec. (NTOU). — *Ibidem*, 9.12.1984 : 1 spec. (NTOU). — *Ibidem*, 8.05.1985 : 14 specs (NTOU). — *Ibidem*, 21.05.1988 : 5 specs (NTOU). — *Ibidem*, 9.01.1989 : 3 specs (NTOU). — *Ibidem*, 2.06.1989 : 6 specs (MNHN). — Tong-Kong, Ping-Tong County, 28.07.1985 : 2 specs (NTOU). — *Ibidem*, 29.10.1988 : 3 specs (NTOU). — Philippines : MUSORSTOM I, stn CP 19, 13°57.8'N, 120°18.2'E, 167-

187 m, 21.03.1976 : 20 specs (one illustrated, MNHN-Na 12621). — Stn CC 69, 13°58.8'N, 120°17.3'E, 187-199 m : 1 spec. — *Indonesia* : "Siboga", stn 306, 8°27'S, 122°54.5'E, 247 m, 8.02.1900 : 7 specs 11-14 mm (ZMA). — Stn 312, 8°19'S, 117°41'E, 274 m, 14.02.1900 : 6 specs 11.5-13.5 mm (ZMA). — CORINDON 2, Makassar, stn CH 206, 01°06'S, 117°45'E, 85 m : 21 specs (one illustrated, MNHN-Na 12622). — Stn CH 208, 00°14'S, 117°52'E, 150 m : 36 specs. — *New Caledonia* : Boulari, 50 m, 13.10.1978 : 9 specs. — *Polynesia, Tahiti* : trap, 11.10.1978 : 4 specs. — External side of the reef, 40-50 m, at night by Scuba diving, 7.01.1984 : 1 spec.

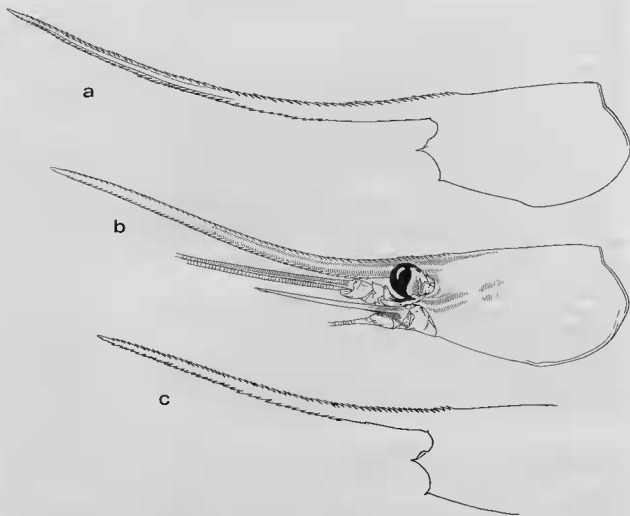


FIG. 12. — *Plesionika narval* (Fabricius, 1787) : a, ♀ 17 mm cl. (RMNH), Italy, Bay of Naples : carapace. — b, ovigerous ♀ 18 mm cl., La Réunion, 150 m : carapace and anterior appendages (After CROSNIER, 1976). — c, ovigerous ♀ 18 mm cl. (NTOU), Taiwan : carapace.

DIAGNOSIS. — Rostrum with basal portion nearly horizontal and without distinct notch at posterior end of ventral border, generally moderately directed dorsad with smooth curvature, 1.5-2.7 (mostly 1.7-2.5) as long as carapace and armed with 39-73 (mostly 48-61) dorsal teeth and 26-60 (mostly 33-53) ventral teeth, posterior 10 ventral teeth corresponding to 9-15 (mostly 10-12) dorsal teeth. Post-rostral carina on carapace with 3-5 teeth. Dorsal end of orbital margin slightly truncate. Stylocerite tapered anteriorly and with outer margin usually slightly curved upward. Scaphocerite more or less as long as carapace. Maxilliped III with well-developed epipod, penultimate segment 1.35-2 times as long as terminal segment, two segments combined 1-1.4 as long as carapace. Carpus of pereopod I 0.8-1.2 (mostly 0.95-1.1) times as long as carapace; pereopods II subequal with 21-31 carpal articles; propodus of pereopod III 0.9-1.35 as long as carapace and 8.5-19 times longer than dactylus;

dactylus robust to elongated with accessory spine distinct and situated posterior to terminal spine. Abdominal pleuron IV rounded but V pointed. Telson as long as or slightly longer than abdominal somite VI in adults.

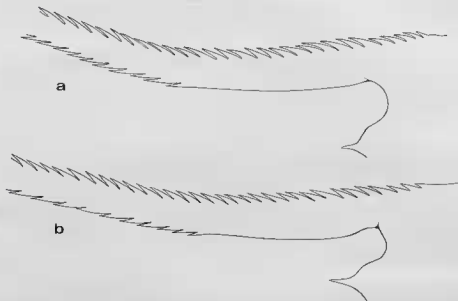


FIG. 13. — Posterior part of rostrum : a, *Plesionika narval* (Fabricius, 1787), ovigerous ♀ 19 mm cl. (MNHN), Nice . — b, *Plesionika serratifrons* (Borradaile, 1900), ♀ lectotype 13.5 mm cl. (UMZC), New Britain, 91-183 m.

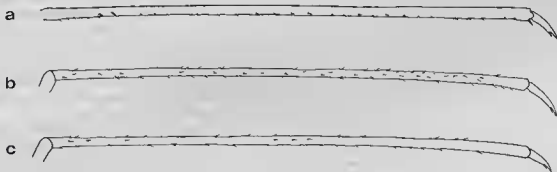


FIG. 14. — *Plesionika narval* (Fabricius, 1787), propodus and dactylus of 3rd pereiopod : a, ♀ 17 mm cl. (RMNH), Italy, Bay of Naples; b, ovigerous ♀ 20.0 mm cl. (MNHN-Na 12621), Philippines, MUSORSTOM 1, stn CP 19, 167-187 m; c, ovigerous ♀ 15.0 mm cl. (MNHN-Na 12622), Indonesia, CORINDON 2, stn 206, 85 m.

Coloration. - Body transparent whitish or somewhat pink-red, with, on each side, one subdorsal and one lateral red-margined white stripe; subdorsal stripe, narrow, running from upper orbital margin and fading on fifth or sixth abdominal somite, lateral one running from the antennal spine to tail-fan, only slightly wider than subdorsal one on its anterior part and becoming wider on posterior half of abdomen. Red margins of the white stripes appearing as 4 deep red lines. Between the red ventral margin of the subdorsal white stripe and the red dorsal one of the lateral white stripe a wide pink marbled stripe tapering to an end on the fifth abdominal somite. Dorsal part of the body between the red margins of the subdorsal white stripes, and lower parts of the body under the red ventral margin of the lateral white stripes, pink. Rostrum red with margins somewhat paler in color. Antennular flagellum white, antennal flagellum red or white. Eye dark brown. Pereiopods often red distally and pink proximally, sometimes entirely red. Eggs pale blue to blue.

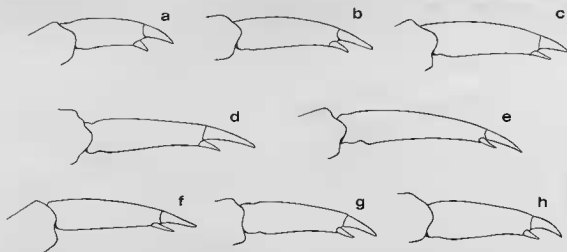


FIG. 15 a-e. — Dactylus of 3rd pereopod of *Plesionika narval* (Fabricius, 1787) following the geographical areas : a, Mediterranean (Greece); b, Mediterranean (Monaco); c, La Réunion; d, Taiwan; e, Philippines.

FIG. 15 f-h. — Dactylus of 3rd pereopod of *Plesionika serratifrons* (Borradaile, 1900) : f, lectotype from New Britain; gh, specimens from New Caledonia.

Variations are observed between the geographical areas. In the Mediterranean according to the photographs published by GEORGE and GEORGE (1980, pl. 69, fig. 4) and CAPPELETTI (1988, 2 photos n. n.), the color pattern seems very similar to the one described above but it differs mainly in that the lower white line on the side of the body is separated by a wider space from the upper one and it is without a clear red line on its upper border. Also in the Mediterranean, DIEUZEIDE (1931) mentions that dorsally, between the upper red margins of both sides, there are 4 gilded lines (the subdorsal stripe being probably gilded rather than white). A similar pattern has apparently been observed also in Japan (cf. MASUDA & HATA, 1969; Anonymous, 1972 : 63; HAYASHI, 1986, photo 89; TAKEDA, 1982, front book cover). Japanese specimens, from the photograph published by HAYASHI, appear to have the subdorsal stripe yellow on the abdomen and white on the carapace and the lateral white stripe covering only the abdomen. In Tahiti from an underwater photograph by P. LABOUTE (fig. 36), the subdorsal line, bright white, extends to the posterior margin of the sixth abdominal somite and the lateral one fades soon after the antennal spine and reappears on the fourth, fifth, sixth abdominal somites and the telson.

As we had no opportunity of observing living specimens from the Mediterranean and as most of the specimens we examined from the Indo-West Pacific were either fresh but dead, or discolored in alcohol, it is impossible to ascertain whether or not the color pattern of the specimens from various areas is really the same. It should be mentioned that from the notes of MASUDA and HATA (1969) it seems that this shrimp is transparent whitish when alive in the sea but becomes rather reddish when it is taken out of water.

SIZE. — Smallest ovigerous female 10 mm cl. (from Philippines, CHACE, 1985), and 11 mm cl. in the present study (from Tahiti). Largest specimen 22.5 mm cl. (ovigerous female from Taiwan). Specimen of 9 mm cl. from Cape Verde Islands and Spain with rudimentary exopod on maxilliped III, but those of 8 mm cl. from Tahiti and Philippines already with well-developed exopod on maxilliped III.

DISTRIBUTION. — Mediterranean in 70-120 meters; Eastern Atlantic coast from Gibraltar to Cape Verde Islands in 175-544 m; South Atlantic (St. Helena); Red sea in 350-910 meters; Indo-West Pacific from Madagascar to French Polynesia in 35-400 meters.

REMARKS. — The material from the different localities, while seeming to belong to *P. narval*, show variable meristic characters (Table 1). Specimens from the Philippines appear to be somewhat distinct by generally having

a shorter rostrum and fewer rostral teeth. On the other hand, the material from La Réunion has a higher number of ventral rostral teeth while the Atlantic material has a longer rostrum. The topotypic material from the Mediterranean has the penultimate segment of maxilliped III proportionally shorter than that of the Madagascan material. More adult material from Madagascar is needed to determine whether the penultimate segment of maxilliped III is consistently longer. Furthermore, the rostral teeth in some of the New Caledonian material are somewhat well-spaced as in *P. longicauda* and the dactylus of pereopod III in the Taiwanese material is proportionally slightly longer.

The shape and proportional length of the dactyl of pereopod III have been used by DE MAN (1920) and CHACE (1985) to separate *P. narval* from *P. serratifrons*. It appears that this character is not reliable since the specimens from the Mediterranean show large variations of this character (fig. 15 a-b), the specimens from La Réunion (fig. 15 c) have rather short dactyl; those from Taiwan (fig. 15 d) and especially those from Philippines (fig. 15 e) have the longest ones (also see table 1 and fig. 14). One must remember that such variations can also be found in the species of *P. spinipes* subgroup.

Since no constant character has been found to separate the different populations, they are treated as the same species. As mentioned above the coloration of the different populations, not well known, shows variations. We think that more information on the coloration of the different populations might provide some insight into this problem and perhaps show that the *narval-serratifrons* complex includes more than two species.

If our identifications are correct, *P. narval* is widely distributed in the Mediterranean, eastern Atlantic north of Cape Verde Islands (except St. Helena, see *P. longicauda* remarks) and Indo-West Pacific from Madagascar to French Polynesia. Moreover, it also has a wide bathymetric range from shallow reef areas to depths of more than 500 meters (even 700-800 meters in the Red Sea).

CHACE (1985), LEMAITRE and GORE (1988) proposed that the name *Pandalus escatilis* Stimpson, 1860, should be revived for the specimens from the Atlantic without an epipod on maxilliped III, but as shown in the present study *P. escatilis* is without doubt a synonym of *P. narval* (see *P. longicauda* Remarks).

Pandalus stylopus described by A. MILNE EDWARDS (1883) from a locality just outside the Mediterranean is likely to be a juvenile of *P. narval* (see *P. yui* Remarks).



FIG. 16. — *Plesionika stylopus* (A. Milne Edwards, 1883), "Travailleur", dredge 39, 34°11'30"N - 7°39'W, 530 m, sand and gravel, 30.07.1882. (After A. MILNE EDWARDS, 1883).

As in the "Siboga" and "Albatross" expeditions, approximately one hundred *P. narval* specimens were collected from only four Philippines stations (one with only 1 specimen) on the MUSORSTOM expedition. In Taiwan, *P. narval* is not very common but sometimes thousands of specimens can be seen in one catch. Such a distribution indicates that this shrimp generally lives in large shoals.

Plesionika serratifrons (Borradaile, 1900)

Figs 13 b, 15 f-h, 17 a-b, 18 a-c, 37

Pandalus (*Parapandalus*) *serratifrons* Borradaile, 1900 : 411, *pro parte*, fig. 8 a-d (type-locality : Blanche Bay, New Britain).

Pandalus (*Parapandalus*) *tenuipes* Borradaile, 1900 : 412, fig. 9.

Parapandalus spinipes - HOLTHUIS, 1980 : 143, *pro parte* (non Bate, 1888).

Parapandalus serratifrons - BURUKOVSKY, 1982 : 42 (in key) ? *pro parte*.

Parapandalus serratifrons 1 - KING, 1984 : 180, fig. 4 Ps.

Not *Parapandalus serratifrons* - DE MAN 1920 : 146, pl. 12, fig. 34 a, c, pl. 13, fig. 34, 34 b, d, e [= *P. narval* (Fabricius, 1787)].

Not *Plesionika serratifrons* - CHACE, 1985 : 121, figs 55-56. — HAYASHI, 1986 : 139, fig. 89 [= *P. narval* (Fabricius, 1787)].

MATERIAL EXAMINED. — **New Britain.** Blanche Bay, 91-183 m, trawl, 15.07.1895 or Nautilus food, 183 m, 19.05.1897 : 1 ♀ 13.5 mm (lectotype, UMZC). — Blanche Bay, 183 m, 1897 : 1 ovigerous ♀ 14.5 mm, [type of *Pandalus* (*Parapandalus*) *tenuipes*, UMZC].

Chesterfield Islands. MUSORSTOM 5 : stn DW 337, 19°53.8'S, 158°38.0'E, 412-430 m, 15.10.1986 : 1 spec.

New Caledonia. "Vauban" : 200 m, trap, 14.10.1977 : 1 spec. — Boulari, 200 m, trap, 22.08.1978 : 3 specs. — Boulari, 100 m, trap, 13.10.1978 : 1 spec. — No data : 2 specs. — No data : 1 spec.

BTCAL : stn CP 84, 20°43.49'S, 167°00.27'E, 150-210 m, 6.09.1985 : 6 specs.

SMB 4, stn DW 40, 24°46.2'S, 168°08.7'E, 260 m, 7.03.1989 : 1 spec. — Stn DW 49, 24°45.5'S, 168°08.5'E, 300 m, 8.03.1989 : 1 spec.

VOLSMAR : stn CA 58, 20°59.6'S, 170°17.4'E, 180 m, 6.07.1989 : 13 specs (one illustrated, MNHN-Na 12619).

DIAGNOSIS. — Rostrum usually with basal region curved slightly upwards with a distinct notch at posterior end of ventral border, directed dorsad and nearly straight (but sometimes bending slightly downwards near apex) and 2.1-2.7 (avg. 2.45) times longer than carapace, armed dorsally with 51-82 (avg. 68) teeth and ventrally with 38-58 (avg. 50) closely abutting teeth, posterior 10 ventral teeth corresponding to 12-16 (avg. 14) dorsal teeth.

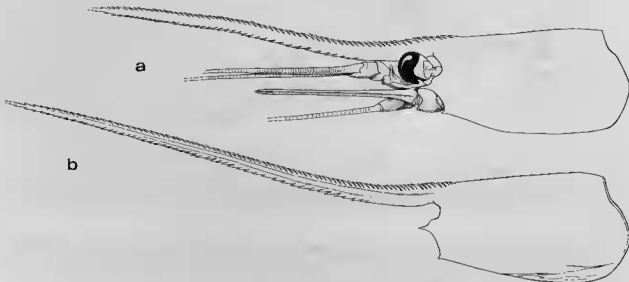


FIG. 17. — *Plesionika serratifrons* (Borradaile, 1900) : a, ♀ lectotype 13.5 mm cl. (UMZC), New Britain, 91-183 m : carapace and anterior appendages. — b, ovigerous ♀ 18.5 mm cl. (MNHN-Na 12619), New Caledonia, VOLSMAR, stn CA 58, 180 m : carapace.

Postrostral carina on carapace with 3-4 teeth. Dorsal end of orbital margin slightly truncate. Stylocerite broadly acute and with outer margin strongly curved upward. Scaphocerite 1-1.1 times as long as carapace. Maxilliped III with well-developed epipod, penultimate segment 1.45-1.7 (avg. 1.6) times longer than terminal segment, two segments combined 1.2-1.35 (avg. 1.3) times longer than carapace. Carpus of pereopod I 1.05-1.4 (avg. 1.15) times longer than carapace; pereopods II subequal and with 27-34 (avg. 30) carpal articles; propodus of pereopod III 0.85-1.3 (avg. 1.15) as long as carapace, dactylus 1/16-1/25 (avg. 1/20) times as long as propodus and with accessory spine distinct and situated posterior to terminal spine. Abdominal pleuron IV rounded but V pointed. Telson usually as long as or slightly longer than abdominal somite VI in adults.

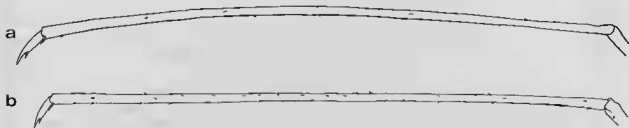


FIG. 18. — *Plesionika serratifrons* (Borradaile, 1900), propodus and dactylus of 3rd pereopod: a, ♀ lectotype 13.5 mm cl. (UMZC), New Britain, 91-183 m. — b, ovigerous ♀ 18.5 mm cl. (MNHN-Na 12619), New Caledonia, VOLSMAR, stn CA 58, 180 m.

Coloration. — Body translucent, reddish with 2 subdorsal longitudinal red stripes running from rostrum to posterior border of fourth abdominal somite where they converge and disappear; between these subdorsal stripes a dorsal one less colored and separated from subdorsal ones by narrow white strips. Each lateral part of carapace and abdomen with 2 longitudinal red stripes: upper one running from orbit to telson, lower one running from base of antennal spine to posterior part of sixth abdominal somite. A white band present below lower red stripe. Breadth of red stripes somewhat variable and consequently breadth of clear stripe running between them varying, being either greater than red stripes or similar. Rostrum red but with upper margin white. Eye dark brown. Antennular flagellum whitish. Antennal flagellum with basal part red and rest whitish. Pereiopods red. Eggs blue.

SIZE. — Smallest ovigerous female 14 mm cl. Largest specimen 22.5 mm cl. (ovigerous female). Specimen of 9 mm cl. with rudimentary exopod on maxilliped III.

DISTRIBUTION. — South-West Pacific; New Britain, Chesterfield Islands, New Caledonia, Vanuatu, Fiji and Tonga, in 91 to 412-430 meters.

REMARKS. — In view of the large variations in the meristic characters of *P. narval*, it is rather difficult to determine whether the material identified here as *P. serratifrons* is different from the former. The average number of rostral teeth, especially on the dorsal border, and the number of carpal articles at the pereopod II are considerably higher in the specimens we identify as *P. serratifrons* (Table 1). Furthermore, the ventral rostral teeth are usually more widely spaced than those on the dorsal border. Only one intermediate specimen which is tentatively assigned to *P. serratifrons* has the posterior 10 (of 54) ventral teeth corresponding to 9.5 dorsal teeth. More importantly, it has been found that the form of the rostrum in our *P. serratifrons* is rather different from *P. narval*. In the former, the basal portion of the rostrum is usually upturned and there is a marked notch at the ventral base (fig. 13 b). Only two specimens have the basal region horizontal and lacking a conspicuous notch (but ventral border convex). In all the specimens of *P. narval* from the Mediterranean (fig. 13 a) and most specimens from other localities there is no well-defined notch present at the base of the ventral rostrum (only in a few specimens from Taiwan, Philippines and Indonesia is there a slight depression at the ventral base of rostrum). Additionally, the outer margin of the stylocerite in our *P. serratifrons* is usually broad and strongly curved upward but it is usually constricted and only slightly curved upward in *P. narval*. Moreover the color pattern seems to be quite different

	Post-rostral teeth	Dorsal rostral teeth	Ventral rostral teeth	Dorsal rostral teeth corresponding to posterior 10 ventral teeth	Rostrum / cl.	Maxilliped III penultimate / terminal segments	Pereiopod I carpus / cl.	Pereiopod II carpal articles	Pereiopod III propodus / cl.	Pereiopod III propodus / dactylus
<i>P. narval</i> Mediterranean 11-19 mm cl.*	3-5 n = 8	60 (45-73) n = 8	43 (35-63) n = 8	11.5 (9-14) n = 10	2.1 (1.9-2.4) n = 7	1.45 (1.35-1.6) n = 11	1.05 (0.8-1.2) n = 11	25 (21-30) n = 21	1.1 (0.95-1.25) n = 6	14.5 (11.5-18) n = 6
Eastern Atlantic 14.5-17.5 mm cl.	3-4 n = 7	61 (49-73) n = 7	46 (33-55) n = 7	11 (10-12.5) n = 8	2.5 (2.3-2.7) n = 7	1.5 (1.4-1.65) n = 7	0.95 (0.9-1) n = 4	25 (23-26) n = 6	0.95 (0.9-1) n = 3	14.5 (13.5-16) n = 3
La Réunion 12-18.5 mm cl.	3-4 n = 9	60 (51-64) n = 9	53 (47-60) n = 10	10 (9-11.5) n = 4	2.15 (1.9-2.35) n = 9	1.5 (1.4-1.55) n = 7	1.1 (1.05-1.15) n = 7	28 (26-30) n = 14	1.2 (1.15-1.2) n = 3	16.5 (15.5-18.5) n = 3
Madagascar 11.5-13.5 mm cl.	3 n = 4	52 (42-62) n = 4	37 (34-40) n = 4	12 (9-14.5) n = 3	2.35 (2.25-2.4) n = 4	1.8 (1.6-2) n = 4	1.05 (0.85-1.15) n = 4	26 (24-30) n = 7	1.2 (1.15-1.2) n = 2	17 (15-18.5) n = 2
Seychelles 10.5-13 mm cl.	3 n = 2	49-57 n = 2	43-46 n = 2	10-11 n = 2	2.1-2.25 n = 2	1.5-1.6 n = 2	0.85-0.9 n = 2	23-25 n = 2	1 n = 1	14.5 n = 1
Taiwan 11.5-22.5 mm cl.	3-5 n = 30	57 (43-73) n = 24	44 (31-58) n = 24	11.5 (9-15) n = 16	1.95 (1.6-2.3) n = 24	1.5 (1.35-1.75) n = 29	1 (0.9-1.15) n = 22	26 (23-31) n = 57	0.95 (0.9-1.15) n = 16	12 (8.5-14) n = 17
South Pacific (New Caledonia + Tahiti) 8-14 mm cl.	3-4 n = 13	56 (46-65) n = 11	42 (31-53) n = 11	11.5 (9.5-14) n = 12	2.25 (2.05-2.45) n = 11	1.25 (1.4-1.7) n = 14	1.05 (0.95-1.2) n = 13	25 (23-29) n = 21	1.25 (1.15-1.35) n = 5	15.5 (13.5-19) n = 5
Philippines Indonesia 12-20 mm cl.	3-5 n = 14	48 (39-61) n = 14	33 (26-42) n = 14	11.5 (10-13) n = 13	1.7 (1.45-2) n = 15	1.55 (1.5-1.8) n = 11	1 (0.75-1.15) n = 11	26 (23-31) n = 17	1.1 (0.95-1.3) n = 8	13.5 (11.5-17) n = 8
<i>P. serratifrons</i> New Caledonia 12-22.5 mm cl.	3-4 n = 13	68 (51-82) n = 13	50 (38-58) n = 14	14 (12-16) n = 16	2.45 (2.1-2.7) n = 10	1.6 (1.45-1.7) n = 10	1.15 (1.05-1.4) n = 9	30 (27-34) n = 20	1.15 (0.85-1.3) n = 11	20 (16-25) n = 11
<i>P. serratifrons</i> Lectotype 13.5 mm cl.	3	63	42	14	2.1**	1.65	Nil	about 27-29 not clear	1.2	16.5
<i>P. tenuipes</i> Type 14.5 mm cl.	3	59	38	15	2.1	Nil	Nil	Nil	Nil	Nil

Table 1. — Meristic characters of *Plesionika narval* (Fabricius, 1787) and *P. serratifrons* (Borradaile, 1900) from different localities

* Size of specimens examined **Rostrum slightly broken

(see "coloration" under *P. narval* and *P. serratifrons* and fig. 34-37). In New Caledonia, the form we identify to *P. serratifrons* is commoner than that identified to *P. narval*. When they occur together they are quite easy to distinguish with the rostral teeth in *P. narval* noticeably more widely-spaced.

It is generally considered that the descriptions and illustrations of *P. serratifrons* and *P. tenuipes* by BORRADAILE are inaccurate (see DE MAN, 1920; CHACE, 1985). The types of both species still exist and they were kindly made available to us by R. C. PREECE from the University Museum of Zoology at Cambridge. The type series of *P. serratifrons* has only 4 specimens left. Interestingly, the 3 smaller specimens are actually *P. spinipes*. Only the largest specimen, a dissected female with well-developed epipod at maxilliped III, belongs to the *P. narval* subgroup and it is the most similar to the figure provided by BORRADAILE (1900, fig. 8 a). Therefore, it has been decided to select this specimen as the lectotype. The meristic characters of the lectotype are on the whole more similar to the commoner New Caledonian form (Table 1) and it also has a distinct notch at the ventral base of the rostrum (fig. 13 b). For these reasons, the lectotype and the specimens of the commoner New Caledonian form are considered to belong to the same species, *P. serratifrons*, and to be different from *P. narval*.

One of the pereiopods III of the lectotype of *P. serratifrons* retains the dactylus (fig. 15 f). It is a little thinner than those of the New Caledonian specimens (which show some variations, fig. 15 g-h) but seems nearer to those of New Caledonian specimens than to those of specimens from the Philippines identified to *P. narval* (fig. 15 e).

Our view is in contrast with that of DE MAN (1920) and of CHACE (1985) who have identified to *P. serratifrons* the form from Indonesia and Philippines with the dactylus of pereiopod III long, which we identify to *P. narval*

with some reservation. CHACE was perfectly aware of the difficulty and wrote: "There is little doubt that the "Albatross" specimens belong to the same species as the Indonesian material identified as *Parapandalus serratifrons* by DE MAN (1920). In view of the obscure distinctions between the species of the *P. narval* group, however, there is no certainty that the species is the same as the New Britain one described by BORRADALE". In the same way we are not very certain that the New Caledonian specimens are true *P. serratifrons*, but it is likely that they are. Of course the acquisition of topotypic material would be useful and, as mentioned above, the knowledge of the color pattern might be a great help for solving the difficult question of the *P. narval-serratifrons* complex.

The type series of *Parapandalus tenuipes* has only one dissected ovigerous female specimen left and it lacks all the thoracic appendages. It was collected from the same locality as the *P. serratifrons* type. Although it has slightly fewer rostral teeth (Table I), it is generally very similar to the lectotype of *P. serratifrons* and also has a distinct notch at the ventral base of the rostrum. In all probability, this specimen belongs to the same species as the lectotype of *P. serratifrons*. If so, the name *serratifrons* is preferred over *tenuipes* because the former is much more common in the literature and the type of this species is in a relatively more complete state. Furthermore the name *tenuipes* has become a synonym of *Plesionika tenuipes* (Smith, 1881) after the genus *Parapandalus* was removed.

The coloration of *P. serratifrons* is quite different from that of *P. narval* in the red stripes being very pronounced but the white lines less conspicuous. The color pattern of *Parapandalus serratifrons* I described by KING (1984) from some South-West Pacific Islands is likely that of *P. serratifrons* rather than that of *P. narval* or *P. rubrior*.

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COLORED SLIDES

- FIG. 19. — *Plesionika echinicola* sp. nov. in association with an Echinid, *Asthenosoma* sp., CALSUB, dive 21, 22°45'S, 167°09'E, Isle of Pines, 332 m. Photograph IFREMER - CNRS.
- FIG. 20. — *Plesionika echinicola* sp. nov., New Caledonia, CHALCAL 2, stn CP 18, 24°47.0'S, 168°09.43'E, 274 m. Photograph P. LABOUTE, ORSTOM.
- FIG. 21. — *Plesionika spinipes* Bate, 1888. Polynesia, Society Is., Maiao, 17°38.6'S, 150°39.0'W, 320 m. Photograph J. POUPIN, SMCB.
- FIG. 22. — *Plesionika grandis* Doflein, 1902. Taiwan. Photograph T.-Y. CHAN.
- FIG. 23. — *Plesionika yui* sp. nov., Taiwan. Photograph T.-Y. CHAN.
- FIG. 24. — *Plesionika laurentae* sp. nov., New Caledonia, CHALCAL 2, stn DW 78, 23°41.3'S, 167°59.6'E, 233 m. Photograph P. LABOUTE, ORSTOM.
- FIG. 25. — *Plesionika rubrior* sp. nov., paratype, Polynesia, Tuamotu Is., Mururoa, 21°48.1'S, 138°55.9'W, 220 m. Photograph J. POUPIN, SMCB.
- FIG. 26. — *Plesionika rubrior* sp. nov., paratype, Polynesia, Society Is., Maiao, 17°38.6'S, 150°39.0'W, 320 m. Photograph J. POUPIN, SMCB.
- FIG. 27. — *Plesionika rubrior* sp. nov., Polynesia, Tuamotu Is., Tuanake, 16°38.4'S, 144°14.6'W, 120 m. Photograph J. POUPIN, SMCB.
- FIG. 28. — *Plesionika rubrior* sp. nov., Polynesia, Tuamotu Is., Mururoa, 21°51.2'S, 139°00'W, 130 m. Photograph J. POUPIN, SMCB.
- FIG. 29. — *Plesionika flavicauda* sp. nov., holotype, Polynesia, Tubuai Is., Rurutu, 22°27.8'S, 151°22.9'W, 240-260 m. Photograph J. POUPIN, SMCB.
- FIG. 30. — *Plesionika flavicauda* sp. nov., Polynesia, Mururoa, 21°51.2'S - 139°00'W, 130 m. Photograph J. POUPIN, SMCB.
- FIG. 31. — *Plesionika flavicauda* sp. nov., paratype, Polynesia, Tuamotu Is., Takapoto, 14°40.0'S, 145°15.2'W, 250 m. Photograph J. POUPIN, SMCB.
- FIG. 32. — *Plesionika flavicauda* sp. nov., Polynesia, Mururoa, 21°51.1'S, 138°58.7'W, 100 m. Photograph J. POUPIN, SMCB.
- FIG. 33. — *Plesionika curvata* sp. nov., Polynesia, Tuamotu Is., Acteon group, Maia, 22°01.8'S, 136°12.4'W, 150 m. Photograph J. POUPIN, SMCB.
- FIG. 34. — *Plesionika narval* (Fabricius, 1787), Mediterranean, Paixos near Corfu, cave, 40 m. Photograph H. LOFFERT.
- FIG. 35. — *Plesionika narval* (Fabricius, 1787), Taiwan. Photograph T.-Y. CHAN.
- FIG. 36. — *Plesionika narval* (Fabricius, 1787), Polynesia, Tahiti, Scuba diving at night, outer slope of reef, 50 m. Photograph P. LABOUTE, ORSTOM.
- FIG. 37. — *Plesionika serratifrons* (Borradaile, 1900), New Caledonia. Photograph ORSTOM.
- FIG. 38. — *Plesionika longicauda* (Rathbun, 1901), Gulf of Mexico, Elvers Bank, 27°50'N, 92°54'W, 134 m. Photograph T. J. BRIGHT Texas A & M University and L. H. PEQUEGNAT La Jolla.
- FIG. 39. — *Plesionika longicauda* (Rathbun, 1901), Gulf of Mexico, Diaphus Bank, 28°05'18"N, 90°41'42"W, 95 m. Photograph T. J. BRIGHT Texas A & M University and L. H. PEQUEGNAT La Jolla.

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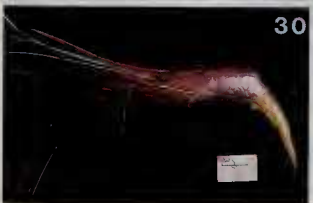
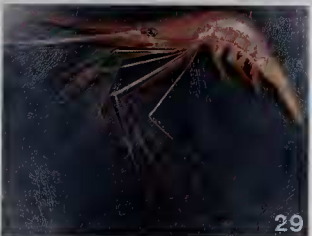


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